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PLASTICS

One shilling — WEEKLY

VOLUME 140 NO. 7 • FEBRUARY 18 1961

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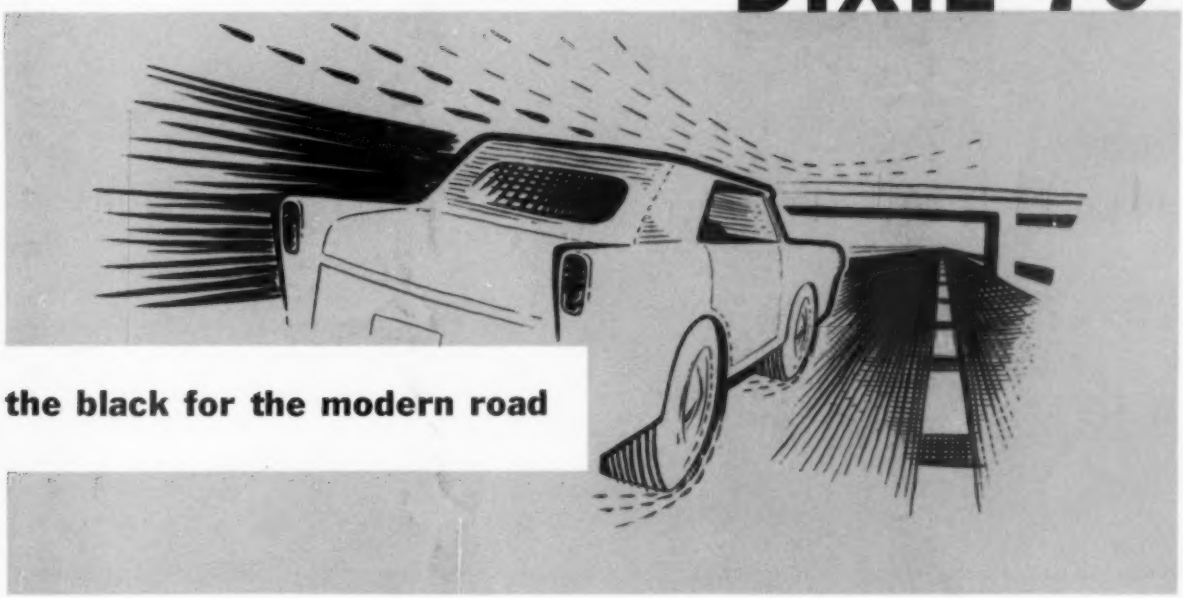

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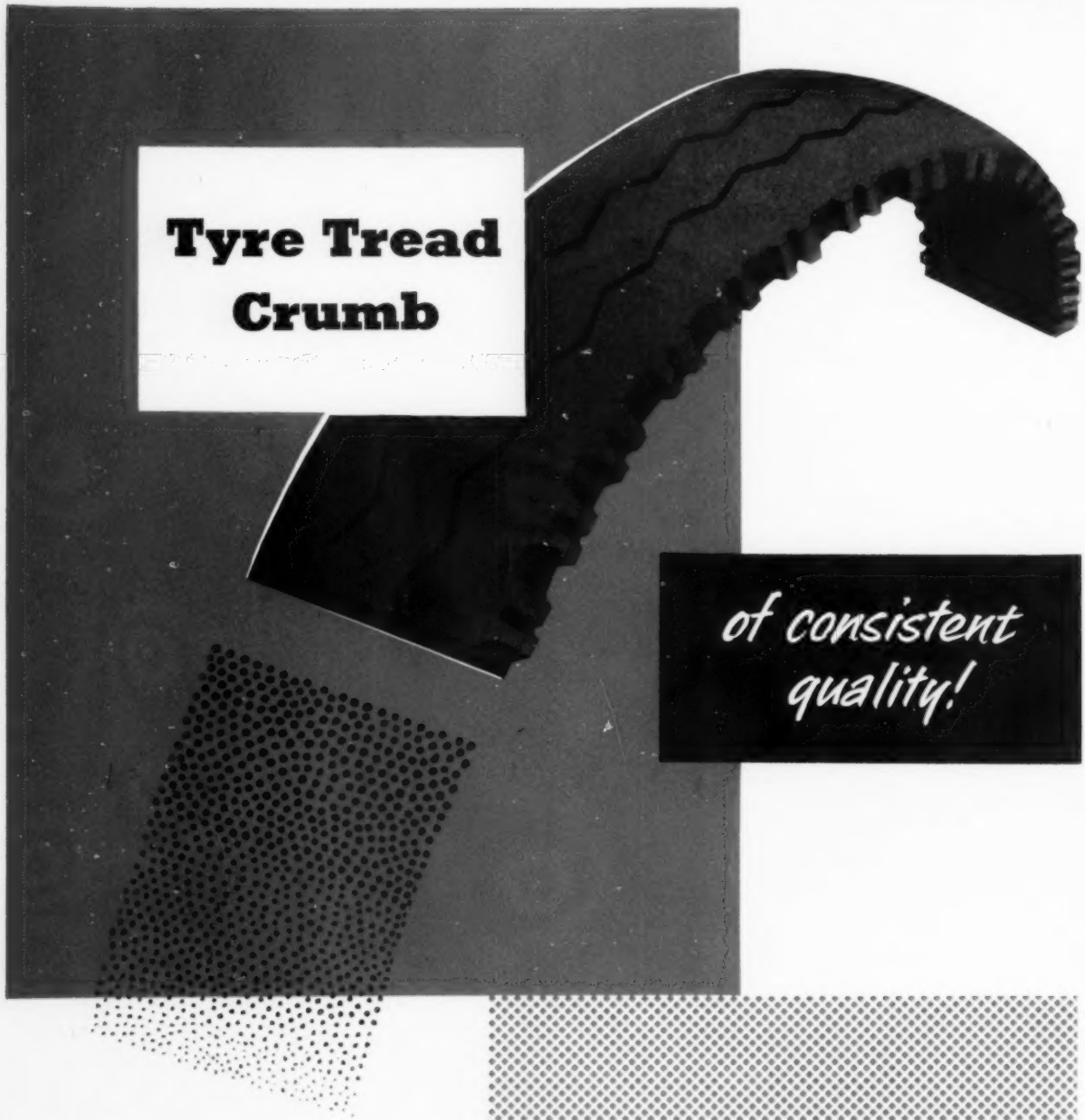

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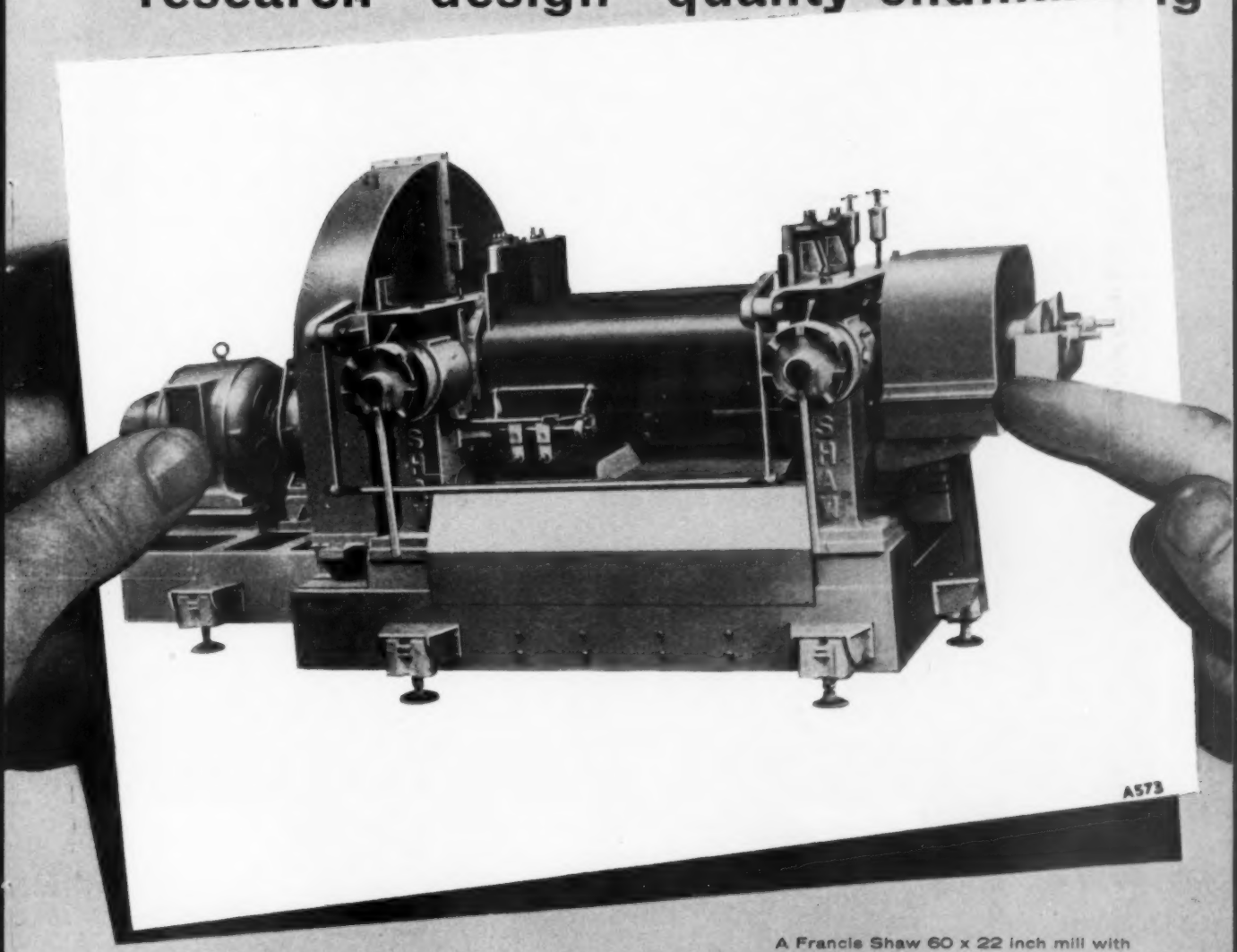

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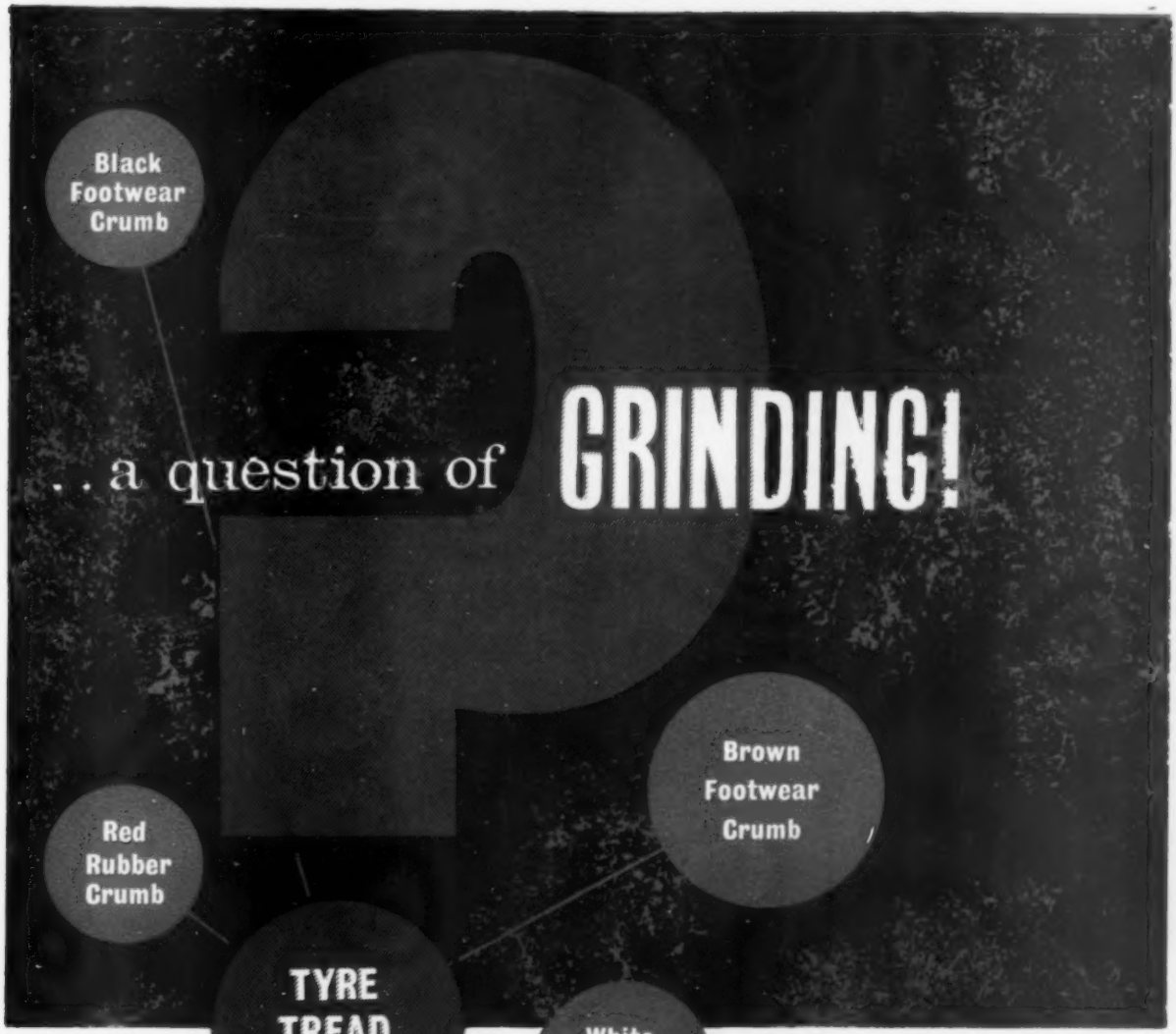

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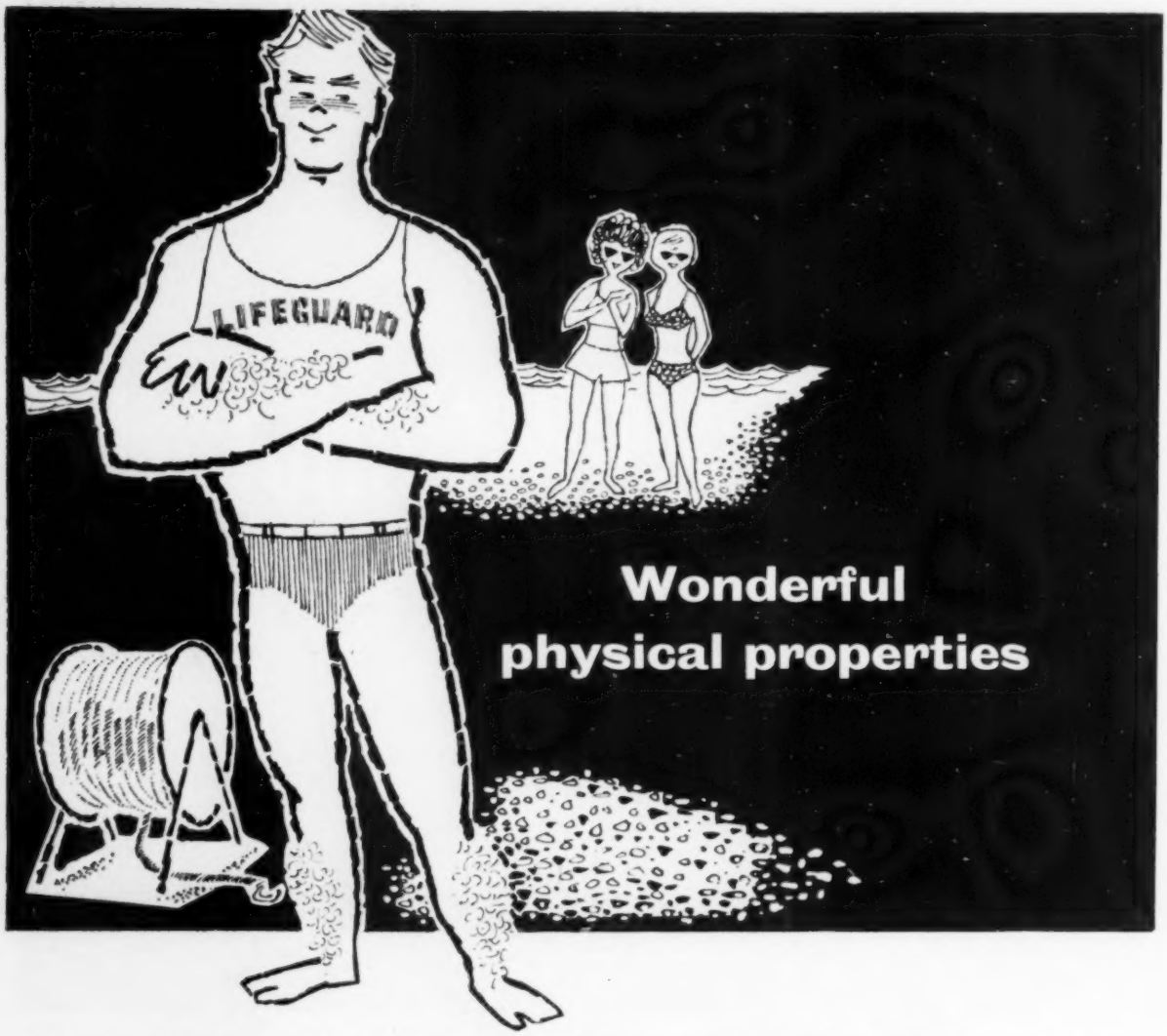

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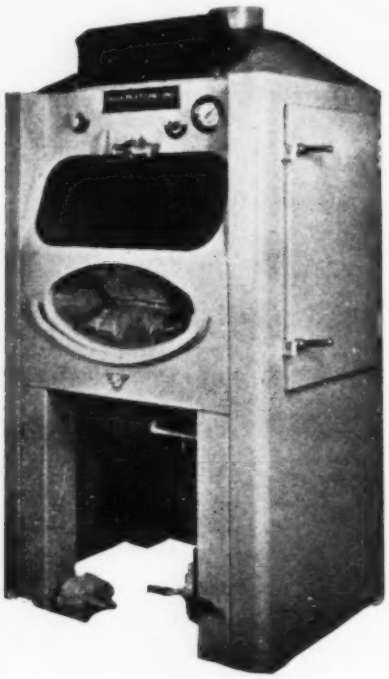

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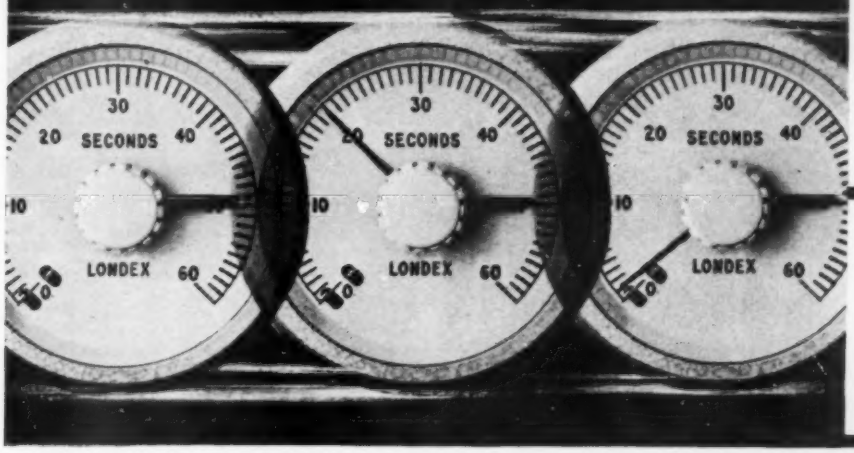

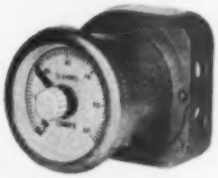

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RUBBER JOURNAL AND INTERNATIONAL **PLASTICS**

One shilling — WEEKLY

Volume 140 *IN ITS 77th YEAR* **No. 7**

February 18 1961

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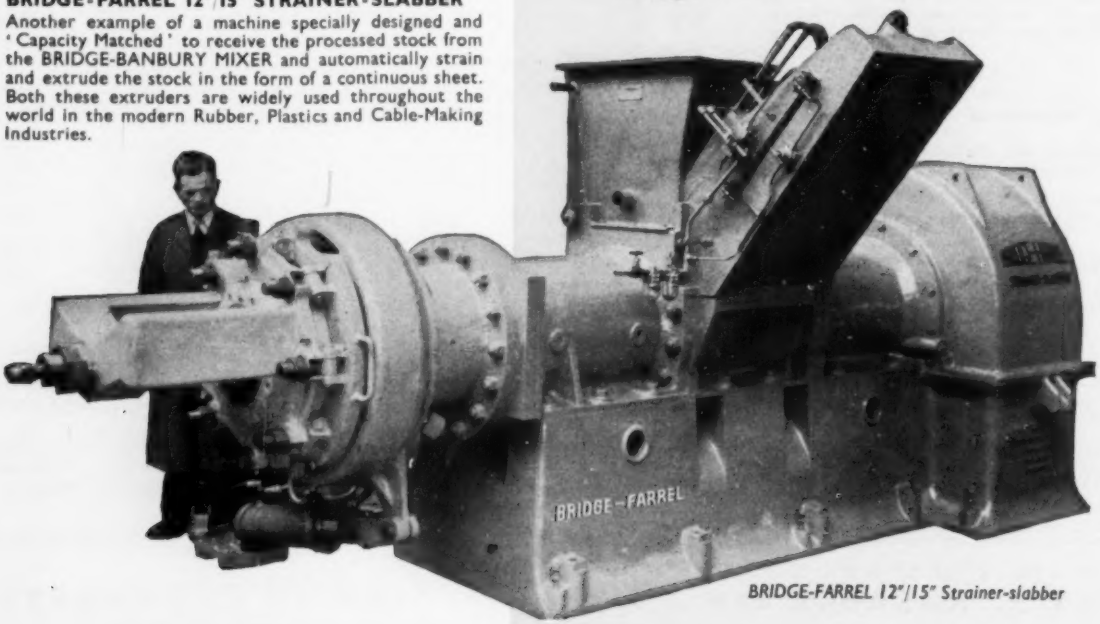

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NOTES of the WEEK

Training for Small Firms

IT is important that a small firm should have an active staff recruitment and training policy. Lacking the resources of a large concern, however, it is often difficult for the small business to keep up with educational developments that have taken place since the war. To find out about any particular scheme means one member of the staff (who is usually overworked as it is) searching through publications and initiating a long chain of enquiries. Because of this, it is easy to understand why many small firms never get beyond the stage of saying 'we must do something about this someday.'

This problem was brought out at the Federation of British Industries' Buxton conference last September, when it was resolved to produce an information booklet on education to help small and medium size firms. With commendable speed this has now been published.* Having this on his desk, the managing director of a small business can see at a glance the various routes to technical qualifications, the types of courses available, and the services offered by such bodies as the Industrial Training Council. A section dealing with group training schemes shows the small employer that, while he may not be able to carry out training on his own, he may be able to do so in co-operation with other small firms.

This booklet should prove particularly useful to the polymer industry, which includes many small businesses. So far as plastics is concerned, these account for a considerable proportion of the industry's turnover, while the rubber industry has well over 300 firms which employ less than 1,000 workers each. Shortage of training facilities is a growing problem within industry; developments like this FBI booklet should make it easier for smaller firms to make contributions towards solving it.

Smooth Shoes

RAPID progress in the use of synthetic materials for shoe soling has been made recently, and the shoe for normal wear produced completely from man-made materials does not seem far off. A number of UK manufacturers have been experimenting for some time with spread PVC materials in attempts to replace the leather upper. One report says that these materials are practically indistinguishable from leather when made up, but whereas after a few days' wear the leather becomes wrinkled with use, the plastic upper remains as smooth as ever. It is, therefore, the report adds, made to look artificial.

It is unfortunate that this 'but it's not like the real thing' attitude is still with us, and that it can go to the length of demanding that, before a man-made material is accepted it must reproduce every feature of the natural product—including its faults. But who thinks like this at this stage? Not the public, because the public has not seen any of these shoes. Objections of this kind are in the minds of the people between the manufacturer and the public—the wholesale and retail buyers, and a host of other people who claim to know what the public wants. Their attitude is frequently too conservative, and can even hold back acceptance of new ideas by the consumer market. When launching the fresh applications that spring from new materials, it would pay to concentrate some of our criticism on the middle men and a little less on the public, who, given the chance by these arbiters of taste, would enjoy walking in smooth shoes.

Uniform Approach

A MEETING of the plastic manufacturers' associations in the European Free Trade Area was held in London on Thursday (February 16), as reported elsewhere in this issue. This very useful meeting, which discussed the implications of the EFTA agreement, should lead to a more uniform approach to EFTA governments on such subjects as 'Rules of Origin' and anti-dumping legislation. So far as we know this is the first time trade associations within EFTA have made such a concerted effort, and the British Plastics Federation deserves congratulations for the part it has played in organizing the meeting.

Preview

THE dependence of a considerable section of this country's economy on the transport industry has been brought into prominence by the current 'recession.' Rubber and plastics, of course, go into every vehicle made, and orders in this field account for a sizeable slice of our industry's turnover. It is estimated that about 10lb. of plastic go into every car and, in addition to tyres, every model contains more than 200 rubber components. In view of the importance of this field, *RJIP* has carried out a special survey of rubber and plastics in transport, which will appear in next week's issue. The effects of the 'recession' on component manufacturers will be analysed, and other subjects dealt with will include recent applications of elastomers in cars and aircraft, developments in reinforced plastics and the growth of RF welding.

* 'Further Education for those in Industry and Commerce.' Published by the Federation of British Industries, 21 Tothill Street, London, S.W.1

NEWS *Briefs*

SWEDEN'S FIRST SBR PLANT—UNITED CARBON ACTIVITIES—FRENCH CONGRESS—US PLASTICS PREDICTION — INDIAN PVC — US TYRE YARN UP

●**United States** — Heyden Newport Chemical Corp. has chosen as its next target in a new speciality product programme the epoxy resins and plastics market. 'Total plastics and resins production should hit a record 6,600m. lb. in 1961,' Simon Askin, president of the Corporation, said, 'with aircraft, electronic, metalworking and coatings industries consuming a good segment of this business.' New products to be introduced for these industries include liquid and resinous curing agents for epoxy resins, and viscosity modifiers.

●**Venezuela** — United Carbon's $3m. carbon black plant to be built near Caracas (*RJIP* Feb. 4, 168) will manufacture six types of black. The venture, for which the Export-Import Bank of Washington has authorized a credit of $1.4m., will increase current South American black manufacture by 40%.

●**Israel** — The Machteshim factory in Beersheba, Israel, has started exporting polyester resins to Cyprus and Turkey.

●**France** — The 33rd International Congress of Industrial Chemistry will be held in France, in Toulouse and Bordeaux, from September 28 to October 8 1961. Among the 23 sections covered will be rubber, plastics, natural and synthetic resins, solid fuels and petrochemistry.

●**United States** — Due to slackening car production in Detroit US Rubber Co.'s Chicopee tyre plant has been closed this week. The plant produces 28,000 tyres a day. Production will be resumed on Monday February 20.

●**Singapore** — An official cable gives the preliminary total of ocean shipments of rubber from Singapore in January 1961 as 88,443 tons.

●**India** — The Delhi Cloth and General Mills Co. Ltd. proposes to manufacture rayon tyre cord and PVC. The company has received an industrial licence from the Government for establishing a PVC plant at Kotah, Rajasthan. Sanction for the tyre cord project is awaited. The tyre cord plant is likely to be located near Calcutta. The capital outlay in respect of both the schemes is estimated at around Rs.9 crores (£6.75m.). The PVC plant is to be constructed with the help of a Japanese firm, and the tyre cord project will have American collaboration.

●**United States** — The United Carbon Co. is to build a carbon black plant, with an initial capacity of 64m. lb. annually, 85 miles north of Los Angeles. Construction of the plant is scheduled for completion within a few months and production is expected by late 1961.

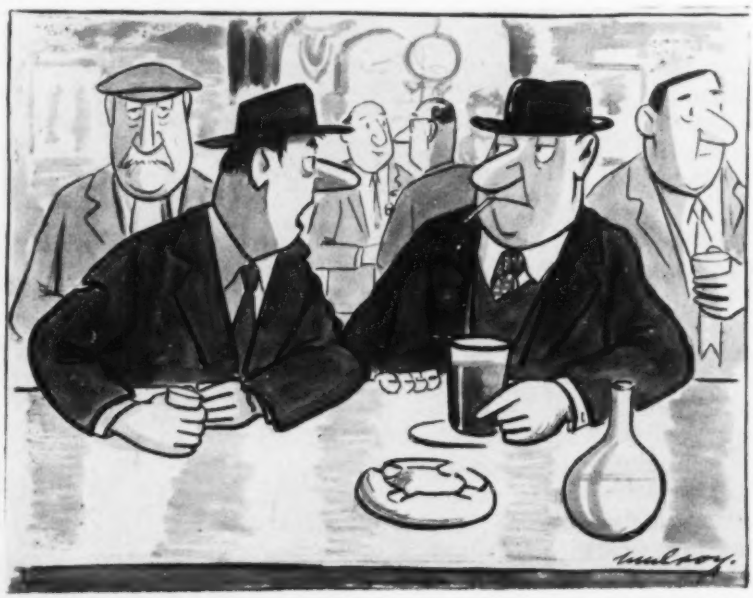
●**Malaya** — Malaya, the Philippines and Thailand have decided to set up working committees of experts to lay the detailed foundations of an Association of South-East Asian States, the Malayan Prime Minister, Tunku Abdul Rahman, said this week.

●**New Zealand** — New Zealand and Malaya have concluded a three-year trade agreement which accords both countries preferential rates of duty. New Zealand has abolished the primage duty on natural rubber and latex from Malaya and has agreed not to raise the ordinary duty on these commodities. At the signing of the agreement, delegates voiced the concern of their Governments about the obstacles and uncertainties of the international commodity trade, which confronted the primary produce exporting countries with a consequent loss of economic stability.

●**India** — K. J. Mendl, export sales manager of BIP Chemicals Ltd., met members of the executive committee of the Indian Plastics Federation in Bombay recently. Mr Mendl is en route to Malaya, Australia and New Zealand, and is expected to be back in UK by the end of March.

●**Sweden** — Negotiations are in progress to expand the Stengungsund, near Gothenburg, chemical plant. It is expected that within the framework of that expansion, the first Swedish factory for large scale manufacture of synthetic rubber will be established.

●**United States** — Prices of rayon tyre yarns have been increased by the Industrial Rayon Corporation by two cents per lb. on 1,100 and 1,650 denier, bringing prices to 59 and 51 cents per lb. respectively. American Enka initiated the price advance and it has been followed by Beaunit Mills, Du Pont, American Viscose and Industrial Rayon.



'Sauce for the goose old man — if they're going to compete with non-rubber garment lines we should hit back with our own 'nattywear' range of tyres!' —524

Strike at Speke

PRODUCTION STOPS AT DUNLOP PLANT

THERE was still deadlock in the unofficial strike at Dunlop's Speke factory when *RJIP* went to press. The strike, which involves 3,500 workers, has brought production to a standstill.

The stoppage began on February 10 when the workers claimed that they had received 'inadequate payment' for time lost when part of the plant was damaged by a gale on February 1.

A number of women in the sports department had been unable to go on working because of the drop in temperature. The strikers claim that the drop in temperature was caused by the removal of a wall during alterations.

Dunlop, however, says that it was caused by the gale and that before the strike began the workers were offered payment at basic rates as compensation.

Dunlop adds that representatives of the workers have demanded payment in excess of that laid down in the national agreement, and have refused to take the matter to the next stage of the negotiating procedure, which would include outside Trade Union officials. The TGWU has urged the strikers to return to work so that negotiations can take place.

Second Largest

Speke is Dunlop's second largest factory, and the company's main centre for the manufacture of industrial belting. It is at present working on a big Russian order for 6½ miles of conveyor belting.

The factory also makes tyres — it is Dunlop's second largest producer — and footwear and sporting goods.

LWG Taken Over

Airfix Industries Ltd. has acquired a group of six private companies specializing in the production of plastic household goods and toys.

The six companies, known as the LWG Group, of Sunbury-on-Thames, are: LWG (Plastics) Ltd; Hermes Supply Co. (London) Ltd.; Gasc and Whyte Properties Ltd.; Fenton Moulds Ltd.; Mount Plastics Ltd.; and Walton Plastics Ltd.

Airfix Industries has acquired the whole of the issued capital of the group, which manufactures a variety of plastic household goods and toys by both injection and blow moulding. It paid a total of £415,000 — £130,000 in cash and 180,000 fully paid up Airfix non-voting 4s. Ordinary shares; 75,000 of these shares have been privately placed to realise £120,000.

£750,000 Reclaim Project

Dunlop Rubber Ltd. and the US Reclaiming Co. of Buffalo N.Y. have concluded an agreement to establish a £750,000 plant in the UK for the manufacture of rubber reclaim.

The plant, which will be located at Liverpool, will be operated by a new joint company in which Dunlop will have a 65% interest. It is expected to be in operation by 1962.

Esso Butyl Contract

Esso Petroleum Co. Ltd. has awarded the contract for the construction of its Fawley butyl rubber plant to Foster Wheeler Ltd.

The plant, which is expected to be completed by the end of 1962, will cost about £4.3m. and produce 30,000 tons of butyl rubber a year.

Cables Conference

The closing date for registration for the joint IRI/PI conference on Rubber and Plastics in Cables to be held on March 1 (*RJIP* December 24, 1067, and January 7, 8) was originally announced as February 14. The conference has been well supported but further registrations will be accepted if these are made without delay.

The New US Rubber Contract

RUBBER traders in New York believe that the new Standard Rubber contract — which goes into operation on February 15, with the first delivery position May 1961 — by liberalizing provisions of the old Rex Contract should widen interest in rubber trading on the Exchange.

More Leeway

These traders, leading importers and dealers, noted that under the new contract RSS 1 inferior in grade down almost to a RSS 2 quality will be allowable for delivery with appropriate discounts. Under the Rex Contract there is only a discount of half a grade between RSS 1 and 2. In addition, there will be more leeway for delivery under the new contract for stained bales.

Another feature of the new contract is that packages of minimum weight of 110lb. will be eligible for certification compared with the 224lb. minimum under the Rex Contract.

Trade sources agree that, with the new provisions, there should be more interest for hedging operations in the Exchange, since there will be less chance of a squeeze because of the difficulty sometimes of obtaining quality rubber to be tended for delivery.

Swinburne Award Address

The first Swinburne Award Address was given by Professor Geoffrey Gee, C.B.E., F.R.S., at the Royal Institution, on February 16.

Professor Gee's address, called 'Plastics in theory and practice,' was followed by the first presentation of the Swinburne Gold Medal.

Stages in the manufacture of belting by Turner Brothers Asbestos Co. Ltd. Left, an early stage: the accurately weighed compounds are dispensed by an intricate conveyor system into a Banbury mixer. Right, from the rubber rolling mills sheets of compounded rubber are sliced off the main batch and placed on an overhead cooling conveyor

Heat Conductive Resins

ALUMINIUM WOOL IN POLYESTERS AND EPOXYS

WITH the development of polyester and epoxy type resins in the fabrication of press tools, foundry patterns and matched die moulds and mould making generally, there is an increasing interest in the use of aluminium wool as a thermally conductive medium in conjunction with the resin.

The two main functions of the aluminium wool in these applications are:

1. To dissipate the exothermic heat generated during the setting of the resin, particularly where thick sections are concerned.
2. To render the final product as heat conductive as a metal.

This latter principle is used where moulds and other equipment are required to be heated and/or cooled during their service life and are thus required to be heat conductive. Typical examples are:

Moulds for the injection moulding of thermoplastic materials where the comparatively short runs do not warrant the considerable cost and time required to make an all metal mould.

The fabrication of 'forms' used in vacuum forming processes of thermoplastic sheeting.

Forming tools for the deep drawing and bending of sheet metals.

Protective housings for instruments and equipment that has to be cooled due to the heat generated during the operation, such as electronic devices used in computers.

Exothermic Heat

During the setting of the resin it is well known that internal temperatures can be reached which are sufficiently high to cause scorching and distortion of the mass and the presence of aluminium wool, which has over three times the thermal conductivity of iron and approximately one-third of its weight, will ensure that this exothermic heat is speedily conducted away and thus prevents scorching and improves the dimensional stability of the product.

Fig. 1 shows the gradual improvement in the heat conductivity of the moulding with increasing quantities of aluminium wool added. Additions of steel wool and aluminium powder produce no practical results as can be seen from the relative curves.

The information in this article has been supplied by Croxton and Garry Ltd., Kingston-on-Thames, who are the distributors of the aluminium wool to which reference is made. Tests on this specially developed wool have been carried out by them over a considerable period of time

This figure is the result of a mathematical examination of the problem (given later) and gives correct information about the trend in heat conductivity for the addition of different quantities of these materials and the relative difference in these values for the different types of additive.

When drawing conclusions from this diagram it has to be remembered that, for the purpose of obtaining a relationship, one theoretical assumption had to be made, namely, that the metal fibres are in a continuous contact between the cooled and heated surfaces. This assumption is never completely fulfilled and it depends on the method of applying the metal fibres and on the shape of the mould how nearly this ideal state is achieved. Generally speaking, it was found that instead of 100% contact there was a contact of between 40% and 70%, and accordingly the relative values of heat conductivity that are achieved are only about 40% to 70% of those shown in the diagram.

To achieve an epoxy mould that has a value of thermal conductivity equivalent, or better than, say, a solid steel mould, the weight % of aluminium fibres would have to be between 55% to 75% accordingly. In most cases this degree of filling can easily be achieved.

Pack Tightly

In fabricating moulds there are several methods which may be employed, but in general it will be found that the most practical will be to add the resin to the cavity in slight excess of the required amount and then pack in the pre-determined quantity of aluminium wool using a press and plunger to ensure that the material is packed as tightly as possible.

For moulds to accommodate large products it may be found advisable to build the mould on the 'hand lay-up' principle round half the model in the initial stages to obtain accurate surface detail on the mould face. When this laid-up portion has reached the 'setting' stage it may then be placed into the main cavity and the additional aluminium wool and resin packed round the model.

For technical reasons, the aluminium wool is supplied in a fairly flexible springy state. It may be desirable that the aluminium wool should conform with somewhat complicated contours, or have a maximum possible pliability which would enable

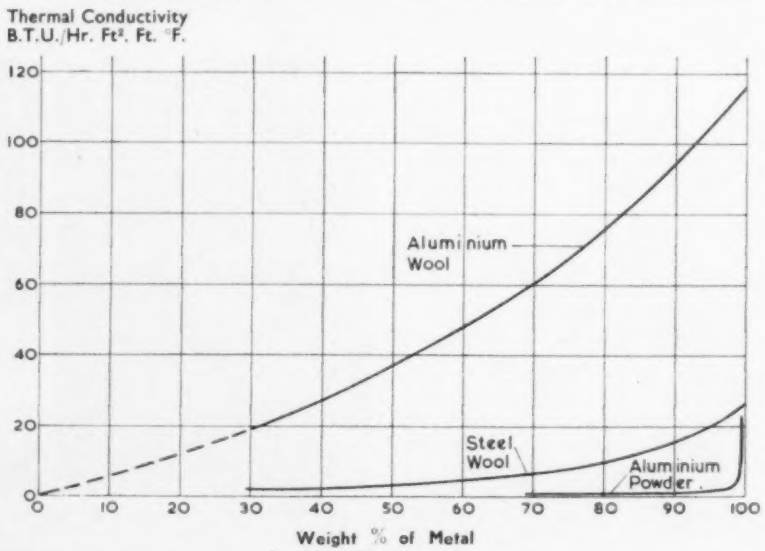


Fig. 1

Thermal conductivity values for epoxy or polyester resins filled with aluminium and steel wool and aluminium powder

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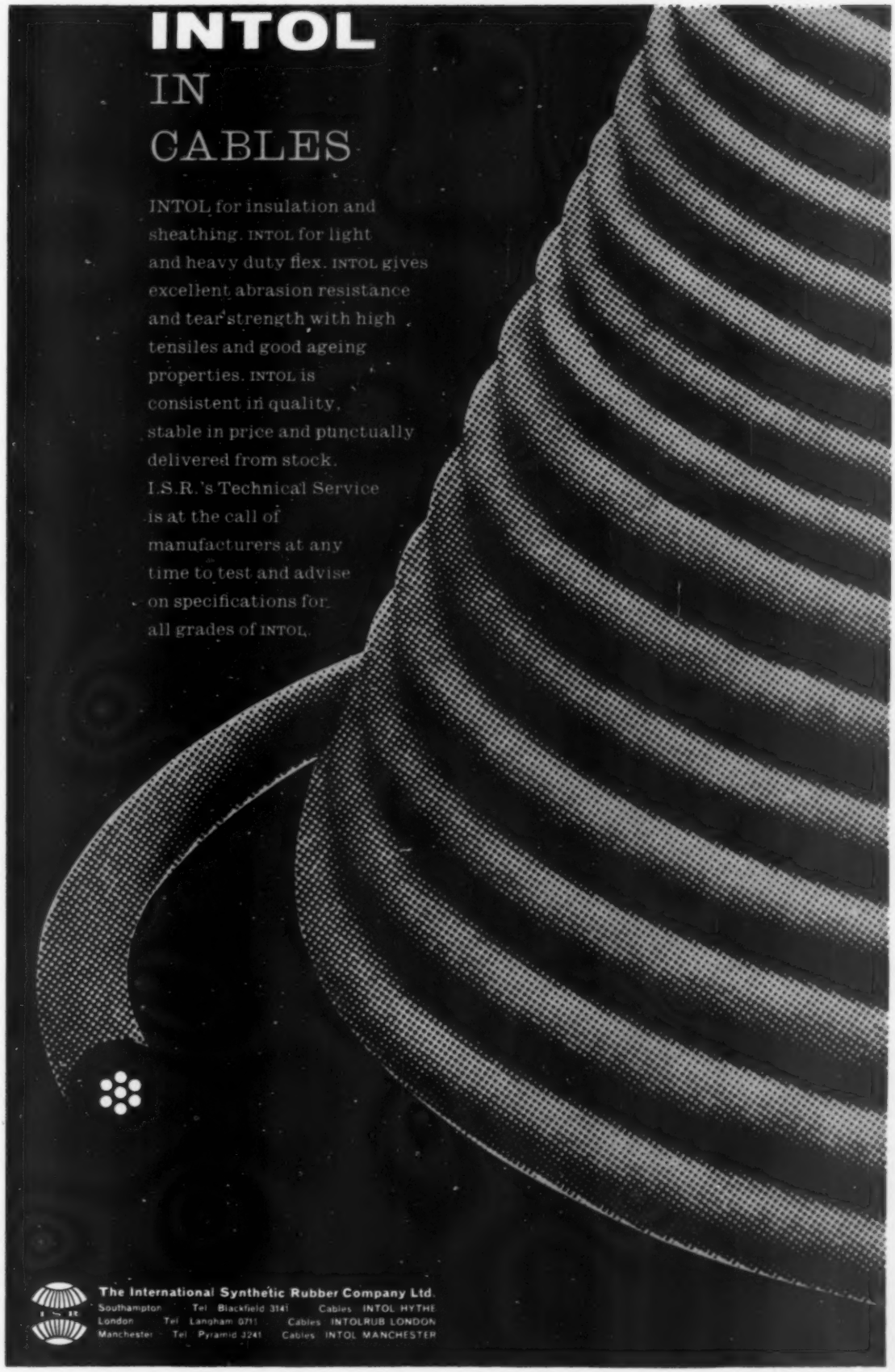


The International Synthetic Rubber Company Ltd.
Southampton Tel Blackfield 3141 Cables INTOL HYTHE
London Tel Langham 0711 Cables INTOLRUB LONDON
Manchester Tel Pyramid 3241 Cables INTOL MANCHESTER

the moulder to pack it tightly. This easier handling of the aluminium fibres can be achieved if they are annealed for about half an hour at 350°C. Whilst doing this care has to be taken to prevent oxidation and the simplest way of doing this is to put the requisite amount of aluminium wool into a closed steel container.

Moulds and other products made from resins containing aluminium wool can be satisfactorily machined if required. Aluminium wool shows superiority over steel wool in this respect as well.

The machinability can be further improved by the addition of the right type of mineral filler to the resin and the one recommended is Omya BLR 2. The addition of the filler is made to the resin before impregnating the aluminium wool.

The use of such fillers has a further important effect, in that the correct proportion will impart thermal expansion characteristics to the resin mixture, equal to that of the aluminium and thus, any differential in movement on expansion and contraction between resin and metal will be practically eliminated. This feature is highly important where products are subject to repeated heating and cooling cycles under service conditions and a properly compounded resin will undoubtedly prolong the life of the product.

A considerable widening in the scope in using epoxy and polyester type resins can thus be expected, thanks to the addition of fibrous aluminium wool. The full scope of this new application may not yet have been estimated, because, no doubt, as the use of this new method is more widely adopted many further applications will be found where the heat conductive plastic composition can be employed to considerable advantage.

Derivation of Formulae

(a) Metal Wool

It has been assumed that the metal fibres are in contact so as to completely bridge the space for which the conductivity is calculated.

The mixture of plastic and metal can be considered as shown in Fig. 2, representing a section, parallel to the direction of heat flow, of a parallel sided slab of the mixture. The metal fibres are compressed into the shaded volume V_m and the plastic occupies the volume V_{pl}. Heat flows between the surfaces AB and CD.

K_m, K_{pl} and K_e are the conductivities of the metal, plastic and mixture respectively. If A_m and A_{pl} are the cross-sectional areas of V_m and V_{pl} normal to the direction of heat flow, then:

$$K_e = \frac{K_m A_m + K_{pl} A_{pl}}{A_m + A_{pl}} = \frac{K_m V_m + K_{pl} V_{pl}}{V_m + V_{pl}}$$

If W_m is the fractional weight of metal then:

$$V_m \sim \frac{W}{S_m} \text{ and } V_{pl} \sim \frac{1-W}{S_{pl}}$$

where S_m and S_{pl} are the specific gravities of metal and plastic.

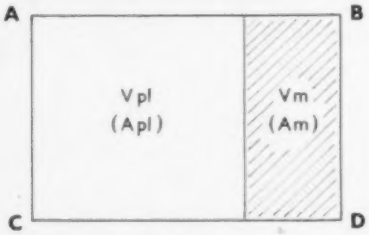


Fig. 2

(b) Metal Powder

The mixture has the same conductivity as two uniform layers of plastic and metal respectively in series, both normal to the direction of heat flow. Fig. 3 shows a section parallel to the direction of heat flow through the two layers.

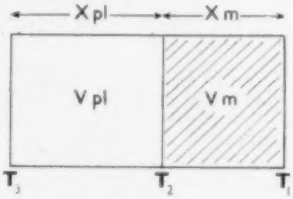


Fig. 3

T_1, T_2 and T_3 are the temperatures of the two outside and common surfaces of the two layers as shown.

'A' is the uniform cross-sectional area of the layers in the direction of heat flow, and K_m, K_{pl}, K_e, S_{pl}, S_m and W are as previously defined.

If Q is the heat flow-rate, then:

$$Q = \frac{K_{pl}(T_3 - T_2)A}{x_{pl}} = \frac{K_m(T_2 - T_1)A}{x_m}$$

from which: $$Q = \frac{A(T_3 - T_1)}{\frac{x_{pl} + x_m}{K_{pl} \quad K_m}}$$

Also: $$Q = \frac{K_e A(T_3 - T_1)}{x_{pl} + x_m}$$

So: $$K_e = \frac{x_{pl} + x_m}{\frac{x_{pl} + x_m}{K_{pl} \quad K_m}} = \frac{V_{pl} + V_m}{\frac{V_{pl} + V_m}{K_{pl} \quad K_m}}$$

V_{pl} and V_m are derived from W, the fractional weight of metal as before.

Numerical Data

The following numerical values were used for calculation:

Material	Thermal Conductivity BTU/hr.ft.²°F./ft.	Specific Gravity
Epoxy resin	0.13	1.20
Polyester resin	0.13	1.20
Copper	219	8.82
Aluminium	116	2.56
Steel	26	7.85

As the epoxy and polyester resins have the same physical constants, the conductivity curves apply, of course, to either resin.

Conductivity of Mixtures

(a) Metal Wool

The conductivity varies linearly with the *volume* % of metal content, but varies non-linearly with respect to % weight of metal, due to the fairly large difference of specific gravity of metal and resin.

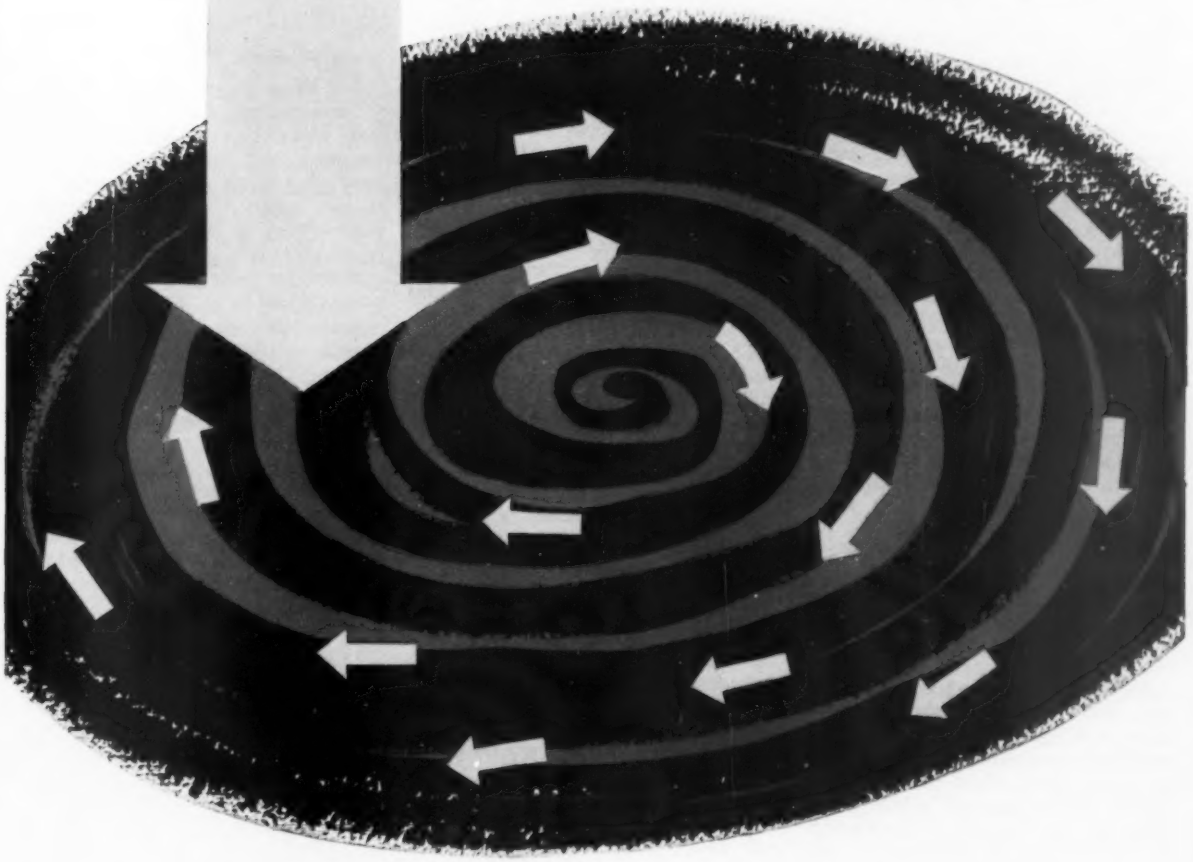
(b) Metal Powder

Due to the conductivity of the metal being very much higher than the plastic the thermal impedance is mainly in the plastic. The conductivity of the mixture therefore rises very slowly with metal concentration and reaches a few % of the metal conductivity at about 99% weight concentration of metal. The conductivity curves are for this reason probably only interesting above 99% weight concentration of metal and have therefore been plotted for this range only.

This EMI Single Hand Monitor measures radioactivity and provides a quick means of checking the contamination of the hands of laboratory staff working with radioactive materials. The housing of the instrument is moulded in polyester resin and glass fibre by John Colinsons Ltd. of Slough, using British Resin Products Cellobond resin

Accelerators in wet cake form

Specially attractive to latex compounders



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Scrap Rubber

ITS CONTRIBUTION TO THE NATIONAL ECONOMY

DELIVERING the second of a series of lectures on reclaimed rubber at the National College of Rubber Technology, R. C. Tonn (H. Muehlstein and Co.) claimed that, contrary to popular opinion, the waste rubber merchant made a positive contribution to the national economy.

He accumulated bulk quantities of scrap material from local dealers and was mainly concerned with its grading, sorting and resale, particularly in the export market. In the past, violent price fluctuations militated against satisfactory business conditions, but the development of the merchant's activities had exerted a marked stabilizing effect in the USA and to a lesser extent in the UK. In any manufacture a certain amount of scrap was inevitable and often this scrap could be reclaimed for further use. So the functions of the merchant were to assist the manufacturer to dispose of his waste products, to supply the grinder or reclaimer with the materials he could process and to seek new applications for the scrap. These activities brought the scrap merchant into close contact with the rubber manufacturer and the reclaimer and his business had grown alongside theirs.

Tyres Solve Shortage

In the past the merchant was concerned with scrap from the manufacture of boots and shoes, matting, horse shoe pads and other miscellaneous articles. Then from about 1915 solid and pneumatic tyres and tubes of various grades became predominant. Formerly the scrap dealer was much in demand as the manufacture and use of reclaim had outstripped the supply of waste material. The major problem then was the collection rather than the selling of scrap. This situation had been changed by the growth of the rubber manufacturing industry. Today the merchant was interested almost exclusively in tyre scrap of which there was a large excess in the USA. Mr Tonn thought that in the UK most of the scrap was re-used but in the US last year about one million tons of passenger tyres were available to reclaimers, but only 25% of these being consumed.

A part of the surplus was used for other purposes but for the residue no use had been found. One of the other purposes was in the manufacture of cheap shoes and sandals which were in demand in certain underdeveloped countries. This involved 'peeling' the tread from the tyre and punching the soles from the carcase. Peelings were used mainly for grinding. As an example of the exploration of new uses, the lecturer pointed to the use of ground peelings and other tyre scrap as carpet underlay. In 1960 some 3,500 tons were latex-bonded for this application. Also experimental use of crumb rubber in bituminous road surfacing continued and the indications were that large scale consumption might result.

Disputes were frequent in earlier times but the merchant had provided a valuable service in arranging agreed standards for various types of scrap rubber and today such disputes were rare.

Scrap Aids War Effort

The predominance of tyre scrap today had led to keen competition and the merchant must work on small margins of profit. He found himself between the manufacturer who desired the highest price for his scrap and the reclaimer who was constantly pressing for the lowest price. Nevertheless in times of national emergency 'mechanicals' and other types of scrap were in demand. Mr Tonn recalled that in 1942 the late President Roosevelt appealed for surplus articles or 'anything which looked like rubber' to be surrendered. The result was that nearly 1¼m. tons were turned over to waste merchants who sorted it and put much of it to useful purpose in the war effort. The handling of such a huge quantity would not have been possible but for the experience of the waste merchants.

In the UK and USA little attention had been paid to the type of cord used in tyre carcases. Recently however, investigations had commenced into the possibility of reclaiming the nylon used in some tyres. Such recovered material might be suitable for moulding and, it was suggested, might turn out to be more valuable than the rubber portion of the tyre.

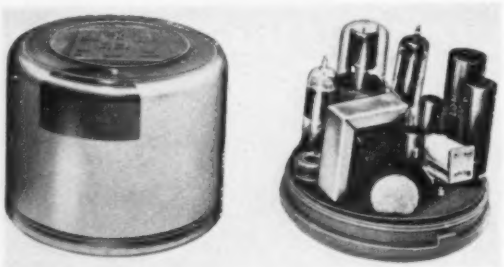
Scrap Synthetic

Mr Tonn mentioned the recovery of unvulcanized scrap and indicated that waste rubber merchants were watching with interest the development of synthetic rubber manufacture in this country. A medium sized plant would be expected to produce up to 1,000 tons per year of defective material for which merchants could probably find consumers.

As reclaim was an important component of many rubber articles, whether based upon natural or synthetic rubber, it followed that consumption of waste rubber, as reclaim or crumb, tended to follow rubber consumption. The figures in the table indicated the number of pounds of rubber consumed per head of the population during 1960 and served to show that the UK was far behind the USA in this respect.

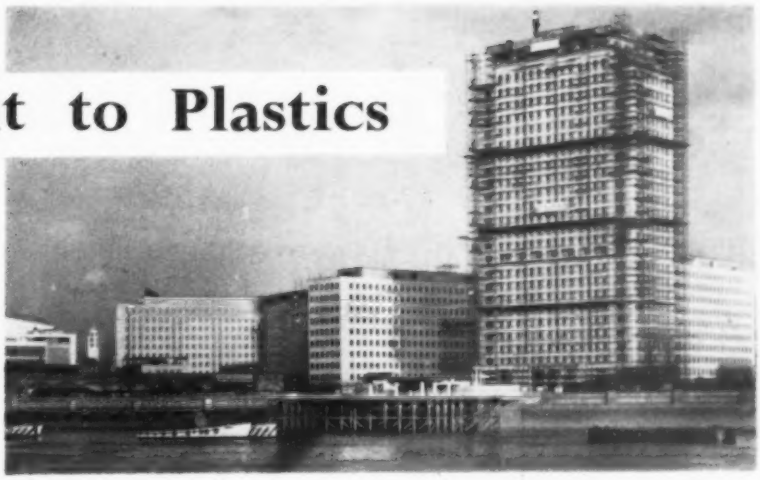
	Total Rubber	Synthetic Rubber	% Synthetic
USA	20.6	14	67
Canada	13.3	8	60
Australia	13.3	5.3	40
UK	11.7	4.3	37

Mr Tonn noted that USA consumed the highest proportion of synthetic — including much oil-extended SBR, which operated as a competitor of reclaim. Nevertheless, in that country, consumption of reclaim was still high and increasing. Here was an indication of a potential advantage available to the British rubber manufacturer and through him to the reclaimer and the waste rubber merchant.



American General Electric is using Cycolac ABS resin for the base (*right*) of this photo-electric street lighting controller. Cycolac, made by Borg-Warner Corp., whose UK agents for this material are Anchor Chemical Co. Ltd., was chosen here for its dimensional stability and good insulation properties

A Monument to Plastics



MANY APPLICATIONS IN THE SHELL CENTRE

FOR anyone inclined to be sceptical about the use of plastics for piping and other building applications, a visit to the new Shell Centre at South Bank, London, would be an enlightening experience.

In this vast project, which is understood to be the largest office building scheme in the UK, plastic materials have been extensively used. It is plain, however, that nowhere have plastics been employed just for the sake of using them in preference to some other more conventional material. Every possible application has been studied and the advantages and disadvantages carefully balanced. Only where it could be shown conclusively that a synthetic material would do the job better than the one it was replacing, has the plastic been chosen. Another factor which militated against the use of plastics was that the architectural planning for the site was completed some years ago, when Shell's interest in plastics was considerably less than is now the case and when plastics were still regarded by many people as 'substitutes' rather than as structural materials in their own right.

Long Life Demand

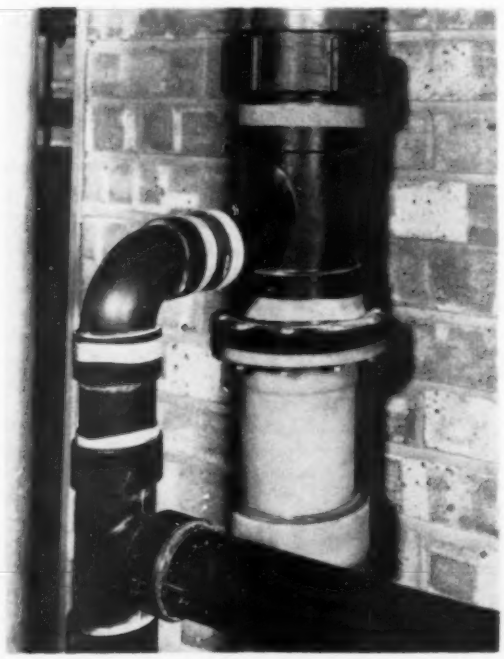
The building industry demands a long life from its materials — rarely less than 30 years and usually not less than 50 — and, with the exception of the older materials such as phenolics, the plastics industry can only predict, from the results of extensive research, the suitability of its materials in given environments, However, despite this limitation, plastics are becoming accepted as important building materials.

The Shell Centre, part of which will be occupied by the autumn of this year, is to be the main London office of the Shell International Petroleum Co. Ltd., and is expected to provide office accommodation for between 5,000 and 6,000 people.

Other facilities are to be provided on a generous scale — canteens, theatre, squash courts, a rifle range and a magnificent swimming pool among them — and were the company to arrange sleeping accommodation on the site as well, there might in the future arise a generation of Shell workers who would never need to leave the building, but who would find all the necessities of life under one roof!

Pipes by the Mile

By far the most important uses of plastics in the project have been in pipework and thermal insulation; the installation of plastic pipes is believed to be the largest in the world. Over 22 miles of plastics pipes have been specified for cold-water services, overflows, venting lines, rain water and soil disposal and liquid soap supplies. Shell Carlona high density polythene is used for the cold water service pipes and the liquid soap supplies. Where low density polythene is used, for horizontal pipes in the sanitation and washroom drainage systems, the polymer is Lupolen manufactured by Rheinische Olefin Werke, a German company partly owned by Shell. Vertical disposal stacks are extruded from Carina PVC with moulded polythene fittings (used because at the time no large size PVC fittings were on the market). Over 50 miles of small bore nylon tubing is to be incorporated in the air conditioning control system and many other washroom and toilet components are in PVC or polythene.



Polythene branch fitting in the main PVC vent stack which runs the full height of each building

PVC versus Linoleum

Over 70,000 sq. ft. of PVC floor tiles are to be laid and this is one

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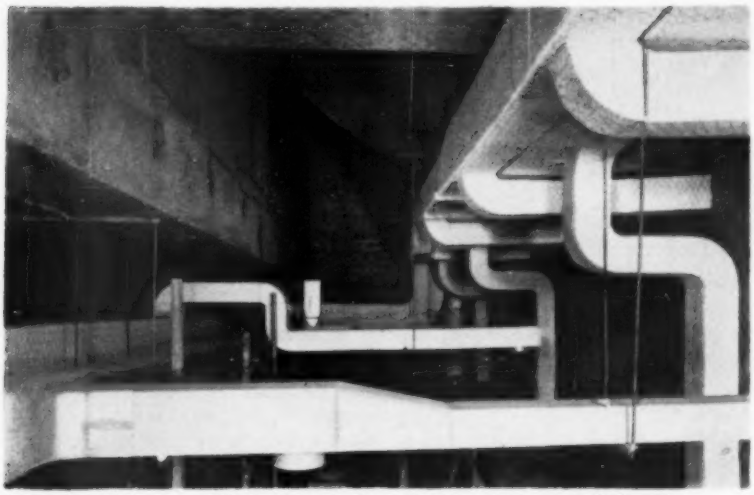

Air-conditioning trunking, insulated with Styrocell expanded polystyrene, located above false ceiling

rather surprising feature, as this figure represents less than 10% of the total floor area. The explanation lies in the fact that at the time that the flooring materials were specified it was not possible to prove that PVC would be an improvement on the cork linoleum which has actually been used. Extensive use of PVC has been made for decorative and hard-wearing wall coverings and facings for partitions and for over 400 miles of electrical cable sheathing.

Shell Styrocell expanded polystyrene in thin boards is widely used as a thermal insulant in ceilings, on the air-conditioning ducting and on the chilled drinking-water pipes. Other uses of plastics include the finish on much of the interior woodwork which is an Epikote resin-based varnish, decorative melamine formaldehyde laminates for cloakrooms and some counter tops and flexible polyurethane foam to be used for sealing strips in the suspended ceiling system.

This new building, destined to be one of London's landmarks, rising over 350ft. and commanding magnificent views over the city, is an interesting example of the wide variety of uses to which plastics can be put in modern building construction.

Light Hydrocarbon Oils

The Economic Secretary to the Treasury has received a deputation from the Industrial Light Oils Committee. This deputation stated its case for amendment of the Customs and Excise Act, 1952, in regard to the relief from Light Hydrocarbon Oil Duty of light oils used for industrial purposes. The deputation stressed the burden of the duty on industrial users and made particular reference to the implications of the European Free Trade Association Convention.

The deputations's case has now been put before the Chancellor of the Exchequer.

Moulded Polyether

The Marley Group has introduced a moulded polyether foam for upholstery called Marleyfoam. It can be made in any shape: 'No longer do seats have to be flat,' the company says, 'they can be domed, which simplifies covering and ensures a wrinkle-free surface — on both sides if desired, making a reversible cushion.'

Plastics Machinery and Toys at Leipzig

R. H. Windsor Ltd. has taken twice the amount of space it took in 1960 at the Leipzig Spring Fair, which opens on March 5 for 10 days. The company's stand will occupy 1,200 sq. ft.

The company is sending three injection moulding machines: one from the UK and two smaller models from the Frankfurt subsidiary in West Germany. The largest model to be shown is the 20/115, capable of moulding articles up to 71oz.

Rosedale Associated Manufacturers Ltd. is sending a collection of more than 200 injection moulded toys to the fair, ranging from ships to junior moon rockets.

EFTA Meeting

A meeting of the plastics manufacturers' associations in the countries of the European Free Trade Association was held in London on Thursday (February 16) at the instigation of the British Plastics Federation.

UK views on the EFTA agreement were expressed by A. Renfrew (I.C.I.), chairman of the overseas trade committee of the British Plastics Federation.

Subjects of discussion included the working of the EFTA agreement; the 'Rules of Origin'; the relationship of EFTA to GATT; anti-dumping legislation; tariff classification of the Brussels Nomenclature and the speed of the tariff adjustment programme within EFTA.

German Firms Open US Offices

TWO West German firms have established joint sales and service offices in USA for their complementary lines of automatic plastic injection moulding machines.

Dr Herbert Frimberger will be president, heading activities under the names of Krauss-Maffei International and Ankerwerk International.

Ankerwerk and Krauss-Maffei single reciprocating screw plasticizing injection moulding machines will be marketed to US custom moulders for the first time on a nationwide basis.

Ankerwerk injection moulders range in size from 1.5 to 36oz., and Krauss-Maffei units from 36 to 120oz. Developed in Germany, the machines are claimed to provide strain free, dimensionally accurate mouldings without the thermal degradation usually associated with plunger mouldings. The line of plastics machinery built by Krauss-Maffei also includes internal mixers and continuously operating double screw mixers, especially designed for extraordinary high output.

The new sales and service offices are at 3 Hamilton Street, Bound Brook, New Jersey, and 1229 H. Wakeham Avenue, Santa Ana, California.

US Woven Spun Roving

A woven glass fibre spun roving manufactured from Owens-Corning Fiberglas Corporation's fibre glass spun roving is now being imported into the UK by Chemicals Trading Co. Ltd., 18-20 Creechurch Lane, London, E.C.3.

This material, which is of 4 x 6 fabric count, is claimed to have excellent drape and draw characteristics. This makes it of value for use in matched metal die applications with deep draws and compound curves, the need for preforms being eliminated.

Seals for Nuclear Engineering

DOWTY DEVELOPS SPECIAL RANGE

DOWTY SEALS LTD. has produced a series of seals developed particularly for nuclear engineering.

They are based on the silicone compound SEM 895, which in addition to normal sealing qualities, meets the primary necessities of heat resistance, protection from radiation and maintains its stability over a wide thermal range and resists compression set.

After an extensive programme of tests, which included the irradiation of specimens by high energy electron beams, a range of 'O' section rings were produced, having long life when used in temperatures up to 150°C., and rectangular section seals for temperatures up to 175°C. and up to 250°C. for short periods.

The new seals are said to be especially suitable for use near reactor vessels, for example stand pipes and control equipment, where radiation is present and temperatures high. Another application of these seals is in 'glove boxes' in which radio-active materials are handled at the Harwell Atomic Energy Research Establishment.

Hands in Gloves

The plastic bag, on the left-hand side of the glove box (Fig. 2), is used in passing the radio-active materials in and out of the cabinet. To reach inside the box the handler fits his hands into the gloves, then removes the respective sealing plugs which are placed inside the box during the handling operation. The handler is thus continuously protected from radio-active effects as the materials being manipulated, and the sealing plugs, are only touched by the outer surfaces of his gloves. It is essential, however, that adequate sealing is provided at all joints and especially where the flexible gloves are attached to the rigid windows of the box.

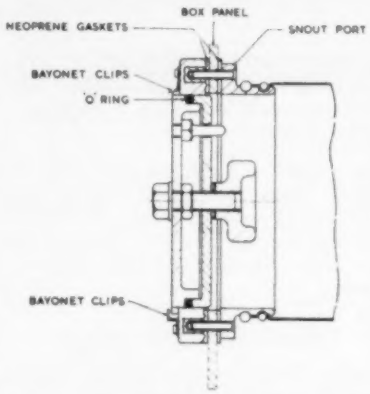

Fig. 1. Glove box sectioned window frame assembly with Dowty seals fitted

Sealing for both the gloves and plugs is effected by 'O'-rings as is shown in the section drawing of the window frame. The glove is stretched over the front part of the frame and is retained by a tension type clip behind which the Dowty 'O'-ring is fitted to prevent any radiation leakage between the glove and the frame.

The Dowty 'O'-ring is used for locking as well as for sealing. When the plug assembly is placed in position and the knurled screwhead is tightened, the two parts of the plug come together thereby compressing the ring and forcing it outwards against the circular frame. This gives positive sealing for the periods when the glove box is not in use.

Fig. 2. One-man glove box for handling radioactive materials

Photo: Atomic Energy Research Establishment, Harwell

Cables for Mobile Radar

The British Army is to have new mobile radar equipment which will enable it to pinpoint the positions from which hostile mortars are firing. Cables and polypole couplers, manufactured by British Insulated Callender's Cables Ltd., form part of this equipment. The cables and couplers link the radar tracking equipment and its generator, as well as the tracker and the unit by which the tracker is operated by remote control.

The cables consist of multi-core PVC insulated and neoprene oversheathed trailing types specially developed for use under field conditions.

Frozen Food Film

A low-density Tenite polythene formulation — called 161M Natural — for extrusion into film that is claimed to have exceptional properties for frozen food packaging has been announced by Eastman Chemical Products Inc.

Characteristics are said to include high impact strength at low temperatures, excellent tear resistance and good optical quality. It is also found to have good slip and anti-blocking features for high-speed packaging operations.

Kenilworth Price Cuts

Price reductions ranging from 10%-20%, and affecting a number of its products, have been made by The Kenilworth Manufacturing Co. Ltd. The reductions apply to the Hermetal Double Bond range of epoxy formulations used as structural adhesives and to the D. B. Toolform range of tooling compounds.

A number of compounds have also been re-formulated to give improved performance and application properties.

Tool Makers to Moscow

The Gauge and Tool Makers Association is organizing a group visit for 48 directors of member firms during the British Trade Fair commencing in Moscow on May 19.

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VIEWS and REVIEWS

TO me, one of the most intriguing fabrication processes from both the practical and the theoretical points of view is the welding of plastics by HF apparatus. There is already an extensive literature on the subject and the technique has now grown out of the phase of an art and craft into a scientific and technological process.

High Frequency Heating

Kunststoffe for October 1960, Vol 50, No. 10, has four articles on the subject, beginning on page 585. The first two deal with the more general aspects of HF heating and mainly with its application to the pre-heating of thermosetting and thermoplastic materials. The other two are concerned with the welding of plastics by HF methods.

In 'Welding Techniques for Plastics Sheeting' by R. Valecka (pp. 590-3) one meets a distinction made less often in English between 'welding' and 'sealing.' In German, one speaks of sealing when one is concerned with the line-welding of the two parts of a seam in thin sheet material or film, while the term 'welding' is generally used to mean the uniting by surface fusion of sheets of thicker materials.

Valecka first discusses the several methods of heat sealing and points out that both the continuously and the intermittently heated bar methods have technical disadvantages, although, because they are cheap and simple, they are used for simple operations such as film packages and bottles. The advantage of HF sealing is that the sealing-bar is cold or cool, the heat being generated within the material being welded.

Two factors, apart from cost, limit the application of HF heat-sealing: non-polar plastics (such as polystyrene and polyolefines, which have too low a loss factor to give adequate conversion of the HF input into heat), and the difficulty of uniting two incompatible materials.

Auxiliary Aids to Welding Plastics

For welding together incompatible materials, it is possible to use an intermediary film of a polar plastic which itself will heat up in the HF field and so heat the other films in contact with it. The various possibilities, variations, and techniques of this principle are the subject of the article, 'High-frequency Welding Auxiliaries' by Dr B. Kowald, on pp. 593-5. The materials described, and here called 'auxiliaries,' are adhesives, solutions, and dispersions of substances carefully selected to produce the right properties for the job concerned.

The general properties of such an auxiliary are: high loss factor, low melting point consistent with temperature resistance, good flow properties when melted to give mechanical anchorage and, when such is not possible, specific adhesion to the materials being joined.

Welding Incompatibles

It is not normally necessary to use auxiliaries when welding PVC films in an HF field but they are useful in some circumstances; for example when the electrodes are exceedingly large or it is desired to reduce the welding time. They can also be employed to ensure the welding of a different type of plastic sheet to PVC.

'Adhesives' of this kind are particularly effective in welding or sealing PVC film or sheet to textiles or paper, cardboard, hardboard and plywood, processes of this kind having led in recent years to the development of mass-produced upholstery and vehicle trimming.

By the employment of these intermediary coatings, quite complicated structures can be fabricated in which the actual welding or sealing is itself a very simple, quite short, mass-production operation, the laying-up or the finishing sometimes being distinctly more complicated and costly. In this way, for instance, furniture or vehicle seat components can be mass-produced consisting of an integration of a rigid base, cellular rubber or plastic cushion interior, and a leathercloth cover.

Some of these and other possibilities are indicated in both of these *Kunststoffe* articles. The last part of the one by Valecka deals with the several techniques for the HF welding of doubled pleats, folds, and bends ('Umbug' welding).

Polymerization Emulsifiers

Also in *Kunststoffe* for October 1960 is a paper on pp. 568-570 by Dr H. Cherdron, called 'Emulsion Polymerization Using Polyacrolein in Sulphurous Acid Solution as an Emulsifier.' This paper attracted my attention because it is based on the principle that the properties of the polymerizate (in these investigations acrolein and acrylonitrile) are unaffected by, and sometimes improved by, using emulsifiers which structurally resemble the polymer itself.

Extrusion-injection Moulding

An enthusiastic but well-considered and well-documented account is given of the evolution of the present types of screw-injection moulding machines, by P. Roesch, the President de L'Union des Syndicats de la Transformation des Matieres Plastiques, in the December 1960 issue of *Industrie des Plastiques Modernes,* Vol. 12, No. 10, pp. 25-29.

Broadly speaking, the ram or plunger type of injection machine, even with the addition of the heated torpedo, has been superseded by the screw-extrusion injector, the introduction of which on the market is, in M. Roesch's own words, 'une date capitale dans notre profession.' It has opened up immense possibilities, enabling the French converters of plastics to catch up with the chemical industry's production of polymer types and even to be ready for the new ones which are coming along.

M. Roesch is much impressed by the results obtained with the new machines. 'I have a definite example of an article moulded from polythene on a screw-extrusion machine compared with one on a transfer machine. On the extrusion machine, we worked at 180° instead of 280° . . . and the article is much better in appearance. In transparency, it looks much more homogeneous and the shrinkage is definitely less: 1.8 to 2.0% instead of 2.5 to 3.0%.'

'I recently saw a radio case and grille, two very complicated articles, formerly moulded on a plunger-injection machine and now completely transformed by moulding by screw-extrusion. . . . They were perfect mouldings, with no rough spots and absolutely uniform in appearance.' An acrylic resin moulding he saw was completely transparent with no interior flaw whatever and this makes

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

him prophesy that very soon 'we shall see lenses and other optical parts perfectly moulded in polymethyl methacrylate on screw-injection machines.'

M. Roesch begins his paper by defining his terms, thus: 'A preplasticizing machine, with screw or plunger, has an auxiliary cylinder in which the material is preheated and preplasticized. This material is then forced into the injecting cylinder proper, by the screw or the plunger, continuously or discontinuously. A machine plasticizing by screw or screws is one in which the material is heated, plasticized by the screw(s) and forced into a chamber in front of it (them). The capacity of this chamber can be varied by means of the length of the screw or by adjustment of the cylinder. The screw serves fundamentally as the injection plunger.'

Historical Development

At first, the injection moulding machine comprised a cylinder in which the material was heated and a plunger or ram which forced the more-or-less melted material into the mould. For this, the most important early development was the torpedo, which was constructed in several forms and primarily intended to improve the heating efficiency. But it was never entirely satisfactory, and, with newer — and less stable — polymers coming along, left much still to be desired. For instance, at this stage of its evolution, the injection machine could not make other than quite small mouldings in PVC or polycarbonates even at very high pressures.

'To this day, the injection moulding of the usual thermoplastics using plunger and torpedo is a compromise between the length and diameter of the channels on the torpedo, the pressure and rapidity of injection, the heating capacity of the cylinder, the efficiency of the system regulating the heating zones in the cylinder, dimensions of sprue channels, and design of the mould.'

What was wanted was more uniform and rapid heating of the charge, and it was screw-extrusion that supplied the answer.

M. Roesch traces the beginnings of screw-extrusion injection as far back as a German patent of Eckert and Ziegler in 1927, but perhaps a British patent of the Celluloid Corporation of New Jersey, taken out in 1935, was the real beginning. Many modifications are described and illustrated by diagrams and photographs, making this paper a valuable historical record of machine development.

It concludes with a summary of the disadvantages and the advantages of extrusion-injection. Thermal homogeneity, lower working temperatures, reduced cycle times, and less contraction, are the main advantages claimed.

Latex Foam Compounding

The technology as well as the technique of compounding a latex is quite different from that of compounding a dry elastomer. The physico-chemical relationships between elastomer and compounding ingredient can be very different, and the phenomenon of reinforcement, so important with dry rubber, is often entirely absent from a latex compound.

The economics of latex foam rubber manufacture have been much influenced by this fact, an extremely important consideration because the material cost is of the order of three-quarters of the total cost. Indeed it is only in the last few years that really serious and successful attempts have been made to reduce the material cost of latex foam articles by compounding. Spasmodic work went on in company laboratories in Britain and the USA, but commercial development and the use of large proportions of fillers, had to await a moment of economic pressure and competitive courage.

This chapter is the history of a not unimportant section of the rubber industry needs the pen of an unbiased historian, because its commercial effects were profound, both on the relationship between the industry as a whole and its customers, and also between the individual manufacturers themselves. Here I am concerned only with the technological aspects, on which little has been published until the paper by J. Escobar-Arronis in the December 1960 issue of *Revue Generale du Caoutchouc* (Vol. 27, No. 12, pp. 1677-83) entitled 'The Influence of Fillers on the Properties and the Ageing of Latex Foam Rubber.'

This investigation was quite empirical, consisting of making foam rubbers from a natural rubber compound containing a range of proportions of five compounding ingredients and submitted, before and after ageing in a Geer oven, and after outdoor exposure in summer and winter, to a number of physical tests. It would have been interesting and useful to have carried the investigation further and to have tried to find a theoretical basis for the results. It will suffice now, I think, if I quote some of the main conclusions reached by the author.

The best results were obtained by adding the dry powders during the frothing operation, except for whiting which had to be made into an aqueous dispersion first.

Glass fibre (4mm.) considerably improved the mechanical properties of the foam rubber except for the elongation at break.

Whiting, mica, french chalk, 'latexyl' silica, all increased the compression modulus but reduced tensile and tear strengths, and elongation at break.

The compounded foam rubbers aged better than the non-compounded, except in respect to elongation at break.

Thermal degradation of latex foam was found to be much more rapid than exposure in the open air.

Latex Flocculation

Latex technologists will also be interested in the publication in *Revue Generale du Caoutchouc* for December 1960 (pp. 1688-91) of the paper presented by Liponski and Vu-dinh-do to the recent Conference at Kuala Lumpur. To provide a useful product, there must be at some stage a reversal of phase in any latex process, and the conditions under which the various kinds of flocculates, aggregates, and coagula are formed are of prime interest.

The title of this paper, 'The Flocculation of Latex and of Centrifuged Serum: Possible Applications,' indicates at once that it has a primary practical aim, but there are theoretical points of interest too. For instance, the type of precipitation — from a tight coagulum to a very fine, suspended flocculation through all the intermediate kinds of coalescence — is largely governed by the *p*H. Most of the work reported here was carried out with a calcium carbonate-aluminium sulphate mixed reagent which the authors hope can become the basis of a continuous process for manufacturing from latex or from skim a rubber in the form of a coarse powder which could be cheaper than sheet because it is more easily dried.

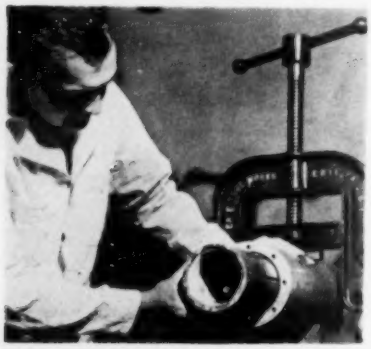
CHARLES JENNINGS

MEN *and* MATTERS

A Review of People and Events

by Peter Richards

A LANDLOCKED rocket and a furnace which generates three times more heat than molten lava are being used to test experimental rocket liners developed by The Goodyear Tyre and Rubber Co.'s research division at Akron, Ohio. The aim of this space age laboratory project is the perfection of lightweight, high-insulating synthetic rubber liners for fuel casings of rockets.



This pipe-like piece of machinery, held firmly by a vice, is a rocket motor which duplicates the temperatures and pressures of a satellite-carrying rocket. Here a Goodyear technician removes an inner section containing samples of experimental liners from the rocket

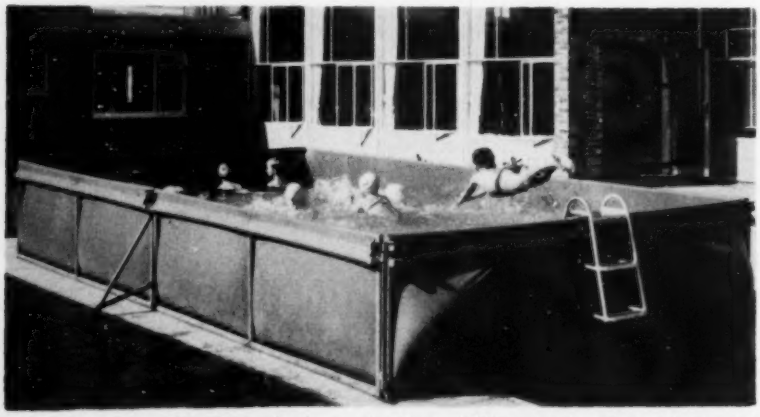
The liners must be able to insulate casing walls from the intense heat of burning solid fuel—ideally, maintaining the walls at room temperature. They must be light, to reduce the rocket's dead weight, and flexible enough to conform to the distortion the casings undergo from the high pressure of propellant combustion gases.

To duplicate the heat that the liners will encounter in flight, Goodyear has installed a carbon arc image furnace which can instantly generate heat beams of up to 6,500°F.

The new installation, which is said to be the only one of its kind in the rubber industry, bounces the heat beams off twin ellipsiodal mirrors and focuses them on the specimen being tested. Control of the heat beam is so precise that a diametric area of only ⅛in. is subjected to the blast. Because radiated heat can pass through a glass container without heating the glass, it is possible to study gaseous by-products of the heating process by testing a specimen in closed containers.

Liner samples which satisfactorily pass these tests then go to a development test centre firing range for further tests in a stationary rocket motor primed with 7lb. grains of solid propellant.

Sensitive machinery wired to the liner samples and shielded by a steel-reinforced concrete blockhouse registers the samples' resistance to heat and thrust erosion under actual flight conditions, and the rocket cuts off automatically after consuming its fuel in about 15 seconds.



With this new swimming bath, made from PVC-coated nylon fabric, the children can literally dive from the confines of Euclid and Boyle's Law into the freedom of the tank *(see: 'No More Crocodiles')*

No More Crocodiles

Soon there will be no more crocodiles of small children clasping rolled up swimming costumes in Southampton. For a long time the town, which has a school population of 35,000 and only two public swimming baths, has had a swimming instruction problem. It hopes to solve it by taking a swimming bath to each school.

The bath is a portable one made from a single flat sheet of I.C.I.'s 'Hydex' PVC coated nylon fabric which is fitted into a steel frame. Two people can erect it in 15 minutes ready for filling with water. The bath measures 20ft. x 10ft. and is 3ft. high. When the water depth is 2ft. it contains 2,500 gallons and is sufficient to take a group of 10 to 12 children for swimming instruction by the shallow water method.

Southampton Education Department used a prototype bath in a mixed primary school of 360 pupils throughout the season of 1959 during which time over 200 of the pupils learnt to swim. To test the 'Hydex' under extreme conditions the bath was left full of water in the autumn until ice formed. No damage occurred. It is now hoped to provide each primary school with a bath of its own.

From £100 to £415,000

How do you make £100 into £415,000 in 15 years? This is not an aimless question — the answer lies in the takeover of the L.W.G. Group of companies by Airfix Ltd., as reported elsewhere.

The LWG Group started in a tumbledown garage in East London in 1944. Thomas Whyte and Pierre Gasc were studying at London University, and both had one more year's work to gain their degree.

But even then they realised the future that lay in plastics.

'We scraped together £50 each and started making various plastic household articles in this garage,' said Mr Whyte. Meanwhile they carried on at the University and graduated with honours.

'But instead of practising as an engineer I decided the future was in plastics,' added Mr Whyte. 'Now I doubt if there is a home anywhere in

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the country that does not have at least one of our bowls, buckets or other plastic household products.' Their range of products includes polythene kitchen utensils and containers, toys, toilet accesories and brushes.

Move to Sunbury

As business expanded, larger premises were needed. The first move was to Stepney then, in 1958, to a two-acre site at Sunbury where the whole of the Group's activities could be concentrated. A year later 65,000 sq. ft. of additional floor space was rented at nearby Walton-on-Thames.

Profits from the Group in 1960 were more than 100% greater than in 1959 — a year which had produced profits nearly 200% higher than 1958.

Both Mr Whyte and Mr Gasc will continue as joint managing directors of LWG. They have joined the board of Airfix, which is also a young, lively firm — they reduce the average age of Airfix's executive directors to 36.

Bader Chief Chemist

Scott Bader and Co. Ltd. has appointed Dr W. G. Schmidt chief chemist of the company. Dr Schmidt studied at the Zurich Institute of Technology, and before the second world war worked on a number of projects which included developments of polymers of vinyl chloride and methyl methacrylate. In 1948 he joined Petrocarbon in Manchester, working on the process development of styrene.

In 1952, he joined Courtaulds Ltd., concentrating on new processes for the production of acrylonitrile polymers for fibres and the synthesis of selected organic acids.

At Scott Bader Dr Schmidt will be responsible for the research development and analytical laboratories, which are engaged in fundamental work on polyesters, polymer emulsions and solutions, and plasticizers.

Polystyrene Aids Physiology

Expanded polystyrene has been playing a part in what might be called 'field' medical research.

A team from the Middlesex Hospital Medical School recently spent three weeks at an altitude of about 14,300ft. at the Vallot Observatory on Mont Blanc, Europe's highest mountain. There were seven members of the team, including three women, and the aim of the expedition was to carry out physiological tests at high altitude, the members of the team acting as their own guinea pigs.

Physiological specimens were taken every 24 hours, frozen on the mountain and flown back to London for deep-freeze storage to await examination when the expedition returned.

As it was essential that the specimens arrived in the frozen state special packages were made for the specimen bottles. These were boxes incorporating a 2in. lining of Shell Chemical's Styrocell expanded polystyrene. This carried out a perfect insulating job: all the specimens dispatched from Mont Blanc were still frozen when they arrived at the hospital.

Phillips Win Safety Award

Phillips Rubbers (Manufacturing) Ltd. is one of 15 firms to gain a British Safety Council 1959 'Safety Award.' This is one of the highest industrial safety awards in the country, and only firms with an exceptionally high safety standard have a chance to qualify.

To gain the award, Phillips has had to better the performances set up by other safety conscious companies in the rubber industry whose figures have been submitted to the Safety Council.

Every accident where a worker has lost time is taken into consideration in computing these figures, and the firm's Accident Frequency Rate (obtained from the number of man hours worked in a year compared with the number of lost time accidents), is compared with the national average AFR for the particular industry. The national figures are prepared by the Ministry of Labour.

Phillips will receive an award certificate from the Lord Mayor of Manchester and Leonard D. Hodge, national director of the British Safety Council. The presentation will take place on February 23.

Fact-Finding Trip

Two top executives of Kay Bros. Plastics Ltd. have been in Germany and Belgium studying the latest developments in the plastic foam industry. The executives, John Webb, a director of the company, and Dr D. F. Rushman, the head chemist, have been looking at machinery used for the conversion and manufacture of plastic foam, particularly the huge UBT 65 process machine, which is said to be one of the most advanced in the world.

Kays are one of the original licensees in this country of Farbenfabriken Bayer for the manufacture of polyester foam and, during their visit, Mr Webb and Dr Rushman discussed latest developments with Bayer and obtained up-to-date information about polyester and polyether foams both moulded and in slab form. All told they visited seven German centres including Cologne and Frankfurt.

L. Lipton, Treasurer of the Waste Rubber and Plastics Merchants' Association of Great Britain, celebrates 50 years connexion with the rubber industry this week

F. C. Pullen, sales manager (*left*), **G. O. Collier, works manager** (*right*) **and E. Walley, the company secretary, have been appointed to the board of Ekco Plastics Ltd.**

Polly Ester Says . . .

'Elastic limit — I'm sure I heard something snap'

The French Plastics Industry

VIGOROUS DEVELOPMENT AND USE OF NATURAL RESOURCES

IT seemed that, before a recent meeting of the London Section of the Plastics Institute, held at the Wellcome Building, Euston Road, London, N.W.1, and addressed by Professor L. Jacqués, most members were not very well informed on the situation of the French plastics industry. But after Professor Jacqué's exposition, they were much more 'in the picture.'

Professor Jacqué, a leading figure in the French plastics and petroleum world, was well qualified to describe the developments there, which have brought French plastics to their present position, and to speculate on future trends.

Base Year 1952

He began by outlining the parlous state of the industry and economy left by the Germans at the end of the war, and said that only in 1948-49 was it possible to begin the job of re-equipping the petroleum and chemical industries. The results began to be apparent from 1950-52 onwards. 1952 was nowadays taken as the base year with which production levels could be compared. In that year 35,000 tons of plastics were made; in 1960 output was about 330,000 tons.

Taking the index for 1952 as 100, Professor Jacqué said that general industry stood at 170, the chemical industry at 290, while plastics reached 950 in 1960.

Of this production, PVC was by far the most important single polymer, he added. About 110,000 tons were made last year, of which 25% was exported. Phenolics, until recently, had occupied the second place with an output of between 30 and 35,000 tons, but in the last year polystyrene and polythene had been growing fast. 40,000 tons of the former had been made in 1960, while polythene with an output of 19,000 tons in 1959, leapt to 35,000 tons in 1960. Annual production capacity would soon be 60,000 tons, Professor Jacqué predicted. Polypropylene was also being developed and it was thought that 60-70,000 tons of it may be produced before long.

Acetate Recovery

Of the other polymers, the speaker pointed to a production of 18,000 tons of unsaturated polyester in 1960 as noteworthy, as was the growth of cellulose acetate after a static period.

The position could be summarized by taking the consumption per head of population. This had risen from 2lb. per head in 1955 to 13lb. in 1960 and imports last year had been approximately balanced by exports.

Raw Materials

Dealing with the manufacture of plastics raw materials, Professor Jacqué said that this occupied some 6,000 people and formed, of course, a part of the chemical industry. As such it was to be found closely associated with the northern coalfields and in the Paris and Lyon regions. More recently, he went on, plants had been erected in several new areas where there had been important developments in coal and petroleum. These were based on the Lorraine coalfields in the north-east, on Rouen and Le Havre oil refining, on the Berre oil-refining area near Marseille and on the new natural gas area around Lacq in the south-west. Production of plastics on the North African coast was also being contemplated because of the ready availability of natural gas.

Professor Jacqué thought that the factors stimulating the rapid expansion of plastics in France, were, broadly speaking, the same as those operating elsewhere. They were first, the astonishing proliferation of polymers and their manifold applications; second, the development of bigger and better machines for conversion of the plastics into finished articles. The speaker selected two fields of application in which he thought plastics would have a great future — housing and agriculture. As a third factor, Professor Jacqué thought that the chemical raw material situation was very favourable to further expansion of plastics. Prices were relatively low and would probably fall still further.

Traditional Aromatics

Coal and petroleum provided the lion's share of the necessary chemicals, and the percentage contribution of petroleum was increasing. Coal products came mainly from the tar, Professor Jacqué said, which arose almost exclusively from the production of coke for steel manufacture. The products were largely the traditional aromatic compounds. But, in addition, he pointed out that the French extracted hydrogen from the gas for ammonia and used the residual methane and ethylene. 20,000 tons per year of ethylene was extracted. In fact, important chemical complexes were being established in the coalfields in the north and east of France, which, among other things, produced acetylene, acrylonitrile, cyanhydric acid, acetone cyanhydrin and styrene.

In marked contrast with the coal interests in this country the French were vigorously developing coal chemistry in view of their falling coal consumption.

Petroleum Developments

Nevertheless it was the petroleum developments that were making the pace, the speaker said. France had shared in the world petroleum and petrochemical upsurge; in addition it had found important indigenous sources of natural gas which were being exploited as quickly as possible. The gas-fields at Lacq (near Pau) were unusual in that they produced a gas very rich in sulphur. So much so, he added, that in 1960 they provided 800,000 tons of sulphur. In 1961 he thought production would be doubled, which would make France the second largest producer of sulphur in the world.

In a brief review of research Professor Jacqué mentioned that the Centre de Recherche des Macromolecules at Strasbourg, under Professor Sadlon, worked on fundamental aspects. The Centre d'Etudes des Matiéres Plastiques under Professor Dubois, in Paris, concerned itself with problems of conversion and engineering. This institution also helped in the training of plastics engineers by providing a final year of specialization, after a general engineering education.

Drawback on Plastic Sheets

The Treasury has made the Import Duty Drawbacks (No. 1) Order, 1961, to provide for the allowance of drawback of import duty on specified imported laminated plastic sheets used in the manufacture of certain exported plastic-bonded asbestos panels. The order came into operation this month and has been published as Statutory Instruments 1961 No. 130.

THE LEGAL ANGLE

On Borrowed Money

By a Barrister

'The Kerala Government has completed arrangements for the issue of long-term loans to small-scale rubber holdings of not less than 10 acres. This credit facility will be made available to private individuals . . .' — RJIP January 21 1961.

If the Government will give you the capital you need, you are fortunate. And in India — where the expansion of the rubber industry is vital — even private individuals look like receiving a piece of luck. But what of Britain?

'Borrow from the bank, of course,' you say. 'The lowest rate of interest, the most reasonable terms . . .'

The Law About Bank Loans

We agree. But do you know the law about bank loans? What interest is a bank entitled to charge if there is no express agreement on the point? Can it dispose of stocks and shares, lodged as securities, without giving you notice? And, in any case, when is a bank loan repayable?

Unless there has been a specific agreement to the contrary, not only is a bank under no obligation whatsoever to grant overdraft or loan facilities to any of its clients, but it can require that the money be repaid at any time upon demand. In this way, bank loans are no different from any other sort — if the borrower wants to be given notice before he can be called upon to repay, then he must make this a term of his agreement of loan.

On the other hand, the bank must make a demand — which is not met — before it disposes of any securities placed in its hands. But — in theory at least — it does not have to wait a month, a week, or even a day after demanding its money, before realizing the securities in its hands.

'But it would wait . . .'

Probably. And certainly, if it has any regard for your custom, any confidence in your credit. But it need not. A bank manager has very considerable power and it is only fortunate for most of us that this power is wielded with such discretion.

'And what about bank interest?'

Unless something special is agreed, the bank will be entitled to charge interest, at 1% above the current Bank Rate.

'And if you cannot get the money from the bank, what then?'

Well, assuming that you cannot raise it from the public, then the most common way out is hire purchase. You get your machinery, use it — and pay for it as you go along. But you must realize the risks of H.P.

Risk No. 1 — your hire purchase agreement will inevitably provide that the owner (the finance company, that is) can repossess the goods, if instalments are not paid on time. If the total hire purchase price does not exceed £300, then you will have the protection of the Hire Purchase Acts and — no matter what the agreement says — the owner will have to get leave of the Court before taking back its property. But if it is over £300 and you are late — heaven help you. The law will not.

It has been held that time is an essential element of a contract of hire purchase and if a payment is late, there has been a most serious breach. It follows that if you are one day late in a payment, then the goods can be taken back from you — even if you have paid 95% of their value. So if you buy on HP, make sure that you do not overstretch your resources: and our advice is, pay by bankers order.

Hire Purchase Interest

Talking of stretching resources, do not forget that while bank interest is charged on the amount of a loan at any time outstanding, hire purchase interest is charged on the entire amount loaned, no matter how much has been paid back. So when a bank says x% is the interest rate, that is that. But if a finance company says so, then you can double it, if you want to work out what it will cost you in the long run. And to cover that sort of interest, the machinery must be very productive indeed.

The moral? Borrow from the bank if you can — but if you cannot, use the 'never-never' as a last resort and do not bank on the kindness of the finance company if you run into a slack period, a falling off in trade . . . an inability to meet your obligations.

Canadian Activities

The first plastics exhibition to be held in Canada will take place in Toronto from October 17-19 1961. UK firms are being invited to exhibit, and enquiries should be sent to 481, University Avenue, Toronto 2. The Society of the Plastics Industry (Canada) Inc. is to hold a symposium at the exhibition.

Chemical Conference

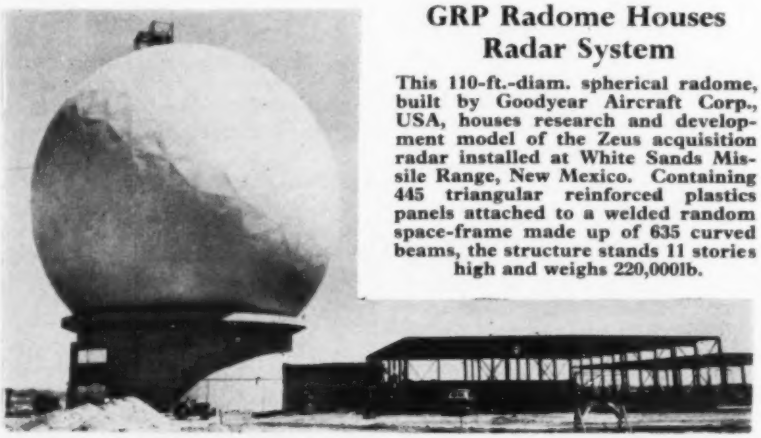
Some 8,000 delegates from all over the world are expected to visit the 60 or more chemical displays to be set up in connexion with the 44th Canadian Chemical Conference and Exhibition of The Chemical Institute of Canada. This Conference and Exhibition will be held August 3-5 in Montreal.

15 for Spring

An exhibition of Sandran vinyl floor covering patterns to be introduced this spring will be held from March 1-3 at the Londoner Hotel, Welbeck Street, London W.1. by Williamson-Sandura Ltd.

Fifteen new effects will be shown.

GRP Radome Houses Radar System



This 110-ft.-diam. spherical radome, built by Goodyear Aircraft Corp., USA, houses research and development model of the Zeus acquisition radar installed at White Sands Missile Range, New Mexico. Containing 445 triangular reinforced plastics panels attached to a welded random space-frame made up of 635 curved beams, the structure stands 11 stories high and weighs 220,000lb.

To recover loss of face

Leave mere face-saving to those who think that excuses are equivalent to performance: here is something more spectacular:—How to recover *more* than face. Does your firm use its solvents only once, and then lose them?

Tell them how much they are losing. We can tell you how much they can *recover*—profitably. If they can't do it at a profit we'll tell you that.

Dazzle them with figures! Be The Man Who Suggested Solvent Recovery By Sutcliffe Speakman! Face, did we say? My dear Sir! We are offering you Reputation—nay—Prestige!

498 THE ILLUSTRATED EXHIBITOR.
from the stock, by M. Lefaucheux, is a fine piece of workmanship. As the opinions of sportsmen are now generally in favour of loading at the breech, as well from its greater facility as its less liability to accidents, there can be little doubt that M. Lefaucheux's improvement upon this invention will be extensively
among others, a splen
an ebony stock; & c
silver mountings, of
whether for real ser
to the guns. The
and silver mounting
the most remarkab
form. We must no
PISTOL IN THE RENAISSANCE STYLE.—M. GAVARNI, PARIS.
REVOLVING PISTOL WITH SIX BARRELS.—M. LEFAUCHEUX, PARIS.
patronised. The REVOLVER PISTOLS, by the same maker, with four or six barrels, are formidable-looking instruments, of which none of us, perhaps, would care to try the power.
A FOWLING-PIECE, by M. Lepage Moutier, with an ebony stock, beautifully wrought, and chased silver mountings, is one of the finest things in the whole collection.
There is great variety in the articles exhibited by M. Devisme. We may mention,
PISTOL CARVED IN

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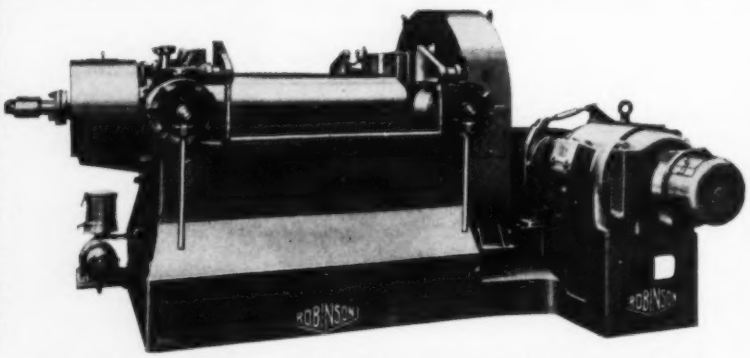

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Rubber Statistics

WORLD POSITION IN NOVEMBER 1960

THE following advance information on the world rubber situation during November 1960 is given by the Secretariat of the International Rubber Study Group. (All figures in long tons.)

NATURAL RUBBER

	November	Jan./Nov.
Production ..	150,000	1,762,500
Deliveries from stockpiles[1] ..	6,500	145,000
Consumption ..	162,500[2]	1,832,500[3]

STOCKS, END PERIOD

	Nov.	Change since Jan. 1 1960
In producing areas	270,000	+ 12,500
In consuming areas	222,500	+ 25,000
Afloat	192,500	— 37,500
	685,000	—

[1]Deliveries from the Government stockpiles of the US and the UK.
[2]Including estimated imports into the Soviet Union of 19,750 long tons and into China of 5,500 long tons.
[3]Including estimated imports into the Soviet Union of 130,250 long tons and into China of 128,000 long tons.

SYNTHETIC RUBBER

	November	Jan./Nov.
Production ..	150,000	1,740,000
Consumption ..	147,500	1,627,500

STOCKS, END PERIOD

Nov.	Change since Jan. 1 1960
355,000	+ 45,000

Reported exports of rubber from Indonesia during November 1960 amounted to 31,676 long tons of which 12,094 tons were reported as being of estate origin. Total reported exports during the period January-November 1960 amounted to 479,949 long tons.

Canada

Consumption of rubber in Canada in the twelve months ended December 1960 declined compared with year before, according to a report issued by the Dominion Bureau of Statistics.

Consumption of all rubber (natural, synthetic and reclaimed) in 1960 amounted to 106,980 long tons, compared to 118,548 in 1959. Natural rubber consumption amounted to 35,179 long tons (44,271 in 1959); synthetic rubber 55,856 long tons (57,204); and reclaimed rubber 15,945 long tons (17,073).

Production during the 12 months ended December 1960 amounted to 166,216 long tons compared to 106,911 a year before. Production of synthetic rubber in 1960 amounted to 159,673 tons (100,682) and of reclaimed 6,544 tons (6,229).

Book Review

SYMPOSIUM ON APPLIED RADIATION AND RADIOISOTOPE TEST METHODS. — Published by the American Society for Testing Materials, Philadelphia. 112 + vi pages. $3.75.

The unique potentialities of radioisotopes in testing procedures and analysis have been known for many years. This symposium represents, however, the first concentrated effort to develop some proposed ASTM methods of analysis and testing involving the use of radioisotopes as analytical tools. It was also intended to stimulate activity not only in other ASTM Committees, but throughout the entire field of analysis. It was hoped that by suggesting ways in which methods involving radioisotopes might be applied to current test methods and research problems, the techniques could be advanced.

Authors were informed that the papers should cover reasonably well developed radioisotope test methods. These methods were to be aimed to fulfil the needs of specific industrial testing problems, and the written paper was to be developed as a 'proposed' ASTM Method. The benefit of the radioisotope method, as compared with existing competitive methods, was to be highlighted so as to stimulate interest and lead to ultimate adoption of the technique as an accepted routine test procedure.

This 'book of the symposium' includes the following papers: 'Nuclear Method for Analysis of Sulphur in Hydrocarbons'; 'Tracer Methods for Rapid Determination of Uniformity of Mixing'; 'Tracer Techniques for Thickness of Very Thin Vacuum-Evaporated Metal Films'; 'Permeability Tests for Organic Sheet Materials'; and 'Radioisotope Methods of Testing Uniformity of Coated Fabrics.'

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

British Standards

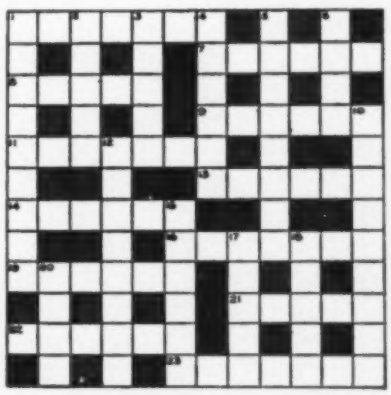
Industrial Rubber Boots

Primarily at the request of Government Departments, the British Standards Institution has published a new British Standard (BS 3299:1960) for industrial rubber boots. It applies to rubber boots for general purposes and does not cover boots giving protection against electrical shock or boots having antistatic or conductive properties.

A companion document to BS 1870, Part 2 (which covers safety boots, of similar construction, which have steel toecaps) the specification gives details of the materials to be used and methods of test, to ensure a satisfactory article. Boots said to comply with the standard must be marked BS 3299:1960 and the BSI Kitemark may also be used, under licence, once BSI have satisfied themselves that the boots are indeed up to standard.

Copies of the standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 4s. 6d. (Postage will be charged extra to non-subscribers.)

RJIP CROSSWORD



CROSSWORD No. 76

CLUES ACROSS

1.—The metallic base of lime.
7.—A Dickens of a Twist.
8.—She's part of a maritime take-over bid.
9.—At the river the 'member' takes tea and is not liable.
11.—Means of ascent incorporate the snake.
13.—The dealer is just another red rat.
14.—Talisman for example.
16.—A natural radicle.
19.—Polymerization vessel.
21.—Stimulate.
22.—The bird or part again.
23.—Longed for time first.

CLUES DOWN

1.—Retreading material.
2.—Cover round the ancient city—it's ghastly.
3.—Angry? That is to say the deserter's inside.
4.—Interfere with the animal first.
5.—A necessity for shipwrecks (4,4).
6.—The peke reforms the castle.
10.—1 down is used for this (4,5).
12.—Lackadaisical.
15.—Try on the outside for an agreement.
17.—The short operation takes time for entertainment.
18.—To make money the beginner starts to take it in.
20.—Dash, most of 18 down again.

(Solution appears on page 272)

BPF Annual Dinner

ENJOYABLE EVENING FOR 850 GUESTS

THE annual dinner and dance of the British Plastics Federation was held on February 10 at the Grosvenor House Hotel, London. Mr David Radford, chairman of the Federation, and Mrs Radford, received more than 850 members and their guests.

After the dinner Mr Radford made a brief speech of welcome to the guests of the Federation and thanked the members for their support, which, as on previous occasions, had been very good. For the second year in succession he regretted the absence, through illness, of the president of the Federation, Mr C. H. Glassey and Mrs Glassey, both of whom were indisposed. The chairman concluded by saying that he hoped that all the ladies present would enjoy the evening and that they would find the gift of the Federation acceptable. They would all, he was sure, be relieved to know before opening their parcels that the contents were not made of plastic, but he reminded them that they had been paid for by the plastics industry. The parcels proved to contain very elegant Danish glass jugs.

Once again this event maintained its well deserved reputation for being a gay and outstandingly enjoyable evening.

As in previous years the cabaret was of a very high standard. Sonny Binick and Sally Brock, five times British and International ballroom dancing champions, gave a faultless display scarcely equalled by the other dancers during the evening. The Konyots, a European double act kept the audience in stitches throughout their act, and the Barrie Manning Champagne Show, a band of diminutive but versatile young ladies, brought the house down with their version of a WRNS band ' all at sea.'

SDD Powders

Associated Chemical Companies (Sales) Ltd. has introduced a range of sodium decyl and sodium dodecyl benzene sulphonates known as SDD Powders 1, 2 and 4. These products are surfactants of particular interest for emulsion polymerization and related applications.

The active content is 97% minimum with unsulphonated matter as low as 1.0% maximum. Electrolyte content is 2.0% maximum sodium sulphate and 0.1% maximum sodium chloride, iron content being negligible. They are all hygroscopic light density flakes.

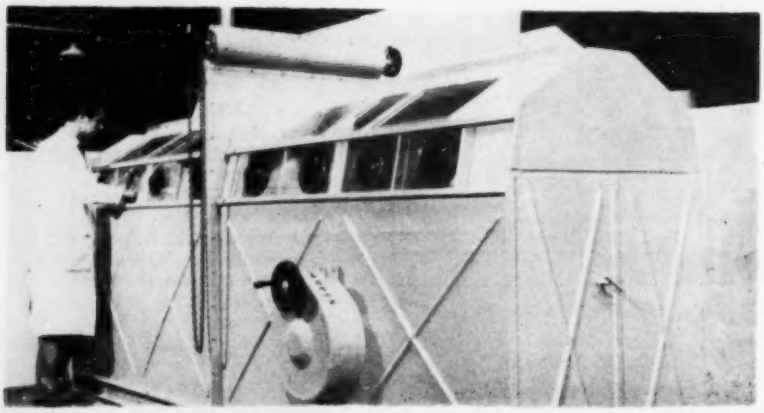
The different alkyl groupings in the side chains confer different physical properties on the powders, each of which has its own particular application, but all are said to possess high wetting and emulsifying properties combined with a strictly controlled composition and very light colour.

New Ecko Director

S. A. Clodd has been appointed to the board of E. K. Cole Ltd. Formerly works manager and executive director, Mr Clodd joined Ekco during the war as material controller.

Underground Order

Metalastik has received an order for sufficient rubber suspension units to equip 200 carriages on the Stockholm Underground.



This reinforced-plastics drum-handling cabinet is for the remote mechanical handling of steel drums in a copper-beryllium plant. The cabinet's function is to draw dust off the drums and then pass them through sliding doors for washing and dressing. Materials used for the cabinet were ' Duramat ' chopped strand mat, polyester resins and acrylic fibre

NCRT to Hold Symposium

A symposium on recent developments in PVC compounding and processing has been arranged by the National College of Rubber Technology. This i to take place on March 21 and 22, and applications should be sent to the head of the college. The fee for participation is £2 10s. (£5 for overseas applicants). The lectures to be given are as follows:

March 21 — ' Factors affecting the properties of vinyl chloride polymers and copolymers,' by C. A. Brighton (British Geon Ltd.). ' Some thoughts on PVC plasticization,' by T. C. Moorshead (A. Boake Roberts and Co. Ltd.). ' Stabilization of PVC compounds,' by J. A. Rhys (F. W. Berk and Co. Ltd.). ' PVC — rubber blends,' by J. E. Branfitt and J. M. Heaps (BX Plastics Ltd.).

March 22 — ' Compounding techniques,' by G. A. R. Mathews (I.C.I. Plastics Division). ' Trends in PVC extrusion,' by A. Kennaway (BTR Industries Ltd.). ' PVC sintering processes,' by W. Adams (Vinatex Ltd.).

Mrs Ruby Hall

The many friends of Ruby Hall, perhaps better known as Mrs Church, whose death on February 7 was announced last week, have indicated their deep regrets to *RIP*.

Mrs Hall, then Miss Welch, joined the staff of the Institution of the Rubber Industry in February 1923, and gave 38 years' devoted service to the Institution. She left a widowed mother (aged 94), two brothers and two sisters, to whom many people in the industry have extended their sympathy.

Mark of Origin

The Board of Trade has been asked to recommend the making of an Order in Council to require imported spectacle frames to bear a mark of origin.

Representatives affected can write to the Secretary, Merchandise Marks Committee, Board of Trade, Room 1103, Horse Guards Avenue, London, S.W.1, before March 30 1961.

Bayer Film

Farbenfabriken Bayer has produced a 16mm. colour film on the processing and applications of Makrolon polycarbonate. The film, which has an English sound track, is available to technical colleges and commercial bodies from R. H. Cole and Co. Ltd., 2, Caxton Street, London, S.W.1.

Shalon Price Reduced

Bakelite Ltd. has reduced the price of its industrial grades of Shalon monofilaments. These grades are used for the filling of scavenger, agricultural and other heavy duty brooms.

British Plastics Federation

ANNUAL DINNER AND DANCE

Among those at the British Plastics Federation dinner and dance were (*left to right*)**: 1. Mr and Mrs David Radford; 2. The Leicester Lovell party; 3. The British Resin Products table; 4. Mr and Mrs F. E. Lowe (Lorrival), W. R. Graves and L. M. Sanders (BIP Engineering), Mrs Sanders, Mrs Groves; 5. One of the I.C.I. tables; 6. Mr and Mrs Harris (Radio and Allied), Mr and Mrs Pusey (Brayhead); 7. The Tufnol party; 8. Mr and Mrs Max Jackson (Metal Box Co.), Mr and Mrs A. Kennaway (BTR); 9. Dr H. W. Kennan, G. S. Bache and Dr G. Swann (Beck Koller); 10, G. W. Hodds (Bakelite) and L. E. Whitmore (Union Carbide); 11. Mr and Mrs N. Eastwood (Fothergill and Harvey); 12. Dr W. Blakey (BIP Chemicals), J. A. Coubrough (BX Plastics), W. A. Swallow (BIP Chemicals)**

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RL53

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Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

LET us leave the subject of shares and prices and stock market behaviour over the past two weeks, for a change. Behind the fascinating business of accumulating a fortune by investing with success, is the more bread and butter stuff such as company news, take-overs and the like. All the world loves a 'rags to riches' story, especially when youth is involved. How many of us, I wonder, have dreamt of starting up in business on our own or with a good friend and eventually selling out for a huge sum. Well, this is exactly what two 35-year-olds have just done. Their names are Pierre Gasc and Gabriel Whyte, who have just sold their business to AIRFIX INDUSTRIES for a handsome £415,000.

Their story begins back in 1944, when at 18 they went into plastics. With the princely sum of £50 each they started making household articles in an East London garage. It has been reported that Mr Gasc has said that the first week's wages brought in around £10 for each of them. At the end of the first year of trading their balance sheet showed a profit of about £60. This compared with last year's profit of £90,000. Called the LWG GROUP, it specializes in the production of plastic household goods and toys.

Airfix are paying out £130,000 in cash and 180,000 non-voting ordinary shares, 75,000 of which have been privately placed to realize £120,000. The six companies that make up the LWG Group are: LWG (PLASTICS), HERMES SUPPLY CO. (LONDON), GASC AND WHYTE PROPERTIES, FENTON MOULDS, MOUNT PLASTICS and WALTON PLASTICS. The group's biggest customer is the giant chain of red and gold shops that trades under the name of F. W. Woolworth. Airfix itself has been doing considerable business with Woolworth's for many years.

Along with all these details came an up-to-date trading forecast from the Airfix board — one of the main reasons for the strength of the shares just recently. It is estimated that profits for 1960 are likely to show a satisfactory improvement over 1959 without taking into account those of the new acquisition. It is felt that the new 'baby' will not only broaden activities, but will also make considerable further productive capacity available. Last Wednesday the managing director Mr Ehrmann, flew to the USA to spearhead a new sales drive.

Shares of the BAKER PERKINS firm have been a big draw, too, over the period under review. The board have announced plans for raising new money by way of a 'rights' issue on the basis of seven shares for every £25 stock at a price of 36s. each. There is also to be a debenture placing of £1,500,000

Continued on page 270

Share Price Movements

Par Value	Company	1960-61 High	Low	Feb. 4	Latest
£1	A.E. Ind. Ord.	67/–	39/–	41/3	41/–
5/–	Albright & W. Ord.	34/3	25/–	27/3	26/9
£1	" " " 5% Pref.	17/3	15/3	15/6	15/6
5/–	Anchor Chemical Ord.	23/6	14/9	17/–	23/3
4/–	Airfix	40/–	23/–	39/–	39/6
4/–	" Non Voting	39/–	23/–	37/–	38/3
5/–	Andersons Rub. Ord.	—	—	3/9	3/9
£1	Angus Geo. Ord.	68/–	34/9	60/6	66/9
5/–	Ault & Wiborg Ord.	28/–	20/–	26/6	25/9
£1	Avon India Rubber Ord.	46/6	30/–	31/6	33/9
£1	" " " 6% Pref.	20/–	17/6	18/9	18/9
10/–	Bakelite Ord.	52/–	33/3	48/6	50/–
£1	" 6% Pref.	19/3	16/9	18/–	18/–
£1	Baker Perkins Ord.	50/6	40/–	42/3	50/6
4/–	Bank Bdg. Rubber Ord.	4/3	1/9	2/–	2/–
4/–	Bettix	—	—	8/–	8/3
4/–	Brammer H. Ord.	18/6	16/3	16/6	16/9
10/–	Bridge, David Ord.	66/6	48/–	49/–	52/6
5/–	Bright, John Ord.	18/6	14/3	16/–	16/–
5/–	Brit. Blting & Asb. Ord.	—	—	17/6	18/6
£1	" " " " Pref.	—	—	15/9	15/9
5/–	British Electronic Indus.	—	—	12/3	13/3
2/–	Brit. Ind. Plas. Ord.	12/6	5/3	11/10½	12/3
2/–	" 10% (tax free) Pref.	4/9	4/3	4/9	4/9
£1	British Xylonite Ord.	81/3	50/6	80/–	81/3
£1	" " 5% Pref.	18/9	14/–	14/6	15/–
£1	BICC Ord.	61/3	47/6	57/1½	57/–
5/–	BTR Ind. Ord.	17/9	9/9	15/–	15/9
£1	" " 7½% Pref.	24/3	21/3	22/3	21/3
£1	Courtaulds Ord.	59/4½	42/–	42/6	43/6
£1	" 5% 1st Pref.	17/9	15/–	15/3	15/3
£1	" 6% 2nd Pref.	21/–	18/–	17/9	17/6
4/–	Cow, P. B. Ord.	9/9	6/9	7/10½	8/1½
£1	" " 5% Pref.	15/6	14/–	14/–	13/6
1/–	Dannimac Mfg. Ord.	14/6	9/–	12/3	12/3
10/–	De La Rue Ord.	78/6	47/9	60/–	59/9
£1	" " " 3½% Pref.	12/–	10/–	10/–	10/6
10/–	Distillers Co. Ord.	38/3	27/9	32/9	33/–
£1	" " 6% Pref.	22/–	19/6	20/–	20/–
£100	" 5% Conv. Loan	£96	£93½	£95	£95
£100	" 5½% Unsec. Loan	£97	£85	£84½	£84½
10/–	Dunlop Rubber Ord.	30/6	19/9	21/9	24/–
£1	" " 5½% Pref.	19/–	15/6	15/6	15/6
£100	" 3½% 1st Debs.	£78	£68	£69	£69
£100	" 4½% 2nd Debs.	£87	£77½	£79½	£79½
£1	Eng. Elect. Ord.	53/6	30/9	32/6	34/3
4/–	Ebonite Cont. Ord.	14/3	7/9	8/–	8/–
£1	English China Clays Ord.	95/–	69/–	85/–	90/6
£1	Goodyear Tyre 4% Pref.	12/9	10/6	11/6	10/6

Par Value	Company	1960-61 High	Low	Feb. 4	Latest
5/–	Greeff Chem. Ord.	35/–	23/–	26/–	31/–
10/–	Greeff Chem. 5½% Pref.	9/–	7/9	7/9	7/9
5/–	Hackbridge Hldg.	8/7½	5/–	5/–	5/6
4/–	Greengate & Irwell Ord.	6/6	5/3	5/6	5/9
£1	Harrisons & Crosfield Dd.	64/–	48/6	48/9	49/3
1/–	Hunt & Moscrop Ord.	2/9	1/4½	1/7½	2/–
£1	Imp. Chem. Ord.	75/3	54/3	72/–	70/6
£1	" " 5% Pref.	18/–	15/6	15/7½	15/9
£100	" 4½% Unsec. Loan	£89½	£80½	£81½	£81½
£100	" 5½% Conv. Loan	£212½	£90xc	£92½	£92½
1/–	Kleemann (O. & M.) Ord.	11/6	8/3	10/4½	11/3
£1	" 6½% Pref.	19/–	17/–	17/–	16/6
5/–	Laporte Ind. Ord.	33/6	21/3	25/7½	26/3
£1	" " 7½% Pref.	24/3	22/3	23/–	22/3
£1	Leyland & Birm. Rubber Ord.	63/–	46/3	47/6	47/6
£1	" " " 6% Pref.	19/–	17/6	18/3	18/1½
2/–	London Rubber	16/–	11/–	15/–	15/3
£1	" 6% Red. Cum. Pref.	20/–	18/–	18/9	18/6
£1	McKechnie Bros. Ord.	71/6	55/–	57/6	55/–
£1	" " 'A' Ord.	69/3	53/–	55/–	55/–
£1	" " 6% Cum. Pref.	18/–	16/–	17/–	17/–
5/–	Monsanto Chem. Ord.	31/–	23/–	26/3	26/–
£1	" " 3½% Pref.	12/9	12/–	12/–	12/–
£100	" " 6% Debs.	£103½	£97	£97	£97
5/–	Miles (H.G.) Hldgs. Ord.	11/3	7/6	8/1½	7/6
2/–	Movitex	—	—	6/6	6/3
£1	North British Rubber	21/3	15/6	16/–	15/7½
5/–	Northwestern Rubber	13/–	9/–	13/–	12/–
5/–	Plastic Enginrs. Ord.	36/–	20/–	28/6	35/6
5/–	Redfern Holdings Ord.	5/9	3/1½	3/6	3/6
2/–	RFD Ltd. Ord.	6/6	3/4½	4/6	4/–
£1	" " 5½% Pref.	14/6	12/9	13/9	13/9
2/–	Rubber Imp. Ord.	7/9	3/1½	3/9	5/3
2/–	" " 'A' Ord.	7/–	3/–	3/3	3/9
£1	" " 5% 1st Pref.	15/–	11/3	11/10½	12/3
5/–	Rubber Reg. Ord.	19/3	16/9	17/–	17/3
4/–	Shaw Francis Ord.	27/6	17/3	20/6	23/–
2/–	Silentbloc Ord.	13/3	8/6	8/9	9/–
5/–	Storey Bros.	41/9	28/3	38/–	40/3
2/–	Sussex Rubber Ord.	2/3	1/3	2/–	2/–
5/–	Sutcliffe Speak Ord.	15/9	11/–	13/9	14/–
£1	Tootals	33/6	26/4½	28/10½	32/9
£1	Turner & Newall Ord.	62/9	48/3	59/9	61/10½
£1	" " " 7% Pref.	25/–	21/3	21/3	21/3
5/–	Universal Asbestos Ord.	50/–	24/–	25/6	25/3
5/–	Viscose Dev. Ord.	16/6	14/9	15/–	15/–
5/–	Warne W. (Holdgs.) Ord.	18/9	14/9	16/3	15/9

Rubber Markets

LONDON

The recovery movement at Singapore, improved factory enquiry and covering by shorts, all contributed in hardening prices by about a ½d. a lb. Buying orders became rather more difficult to place. Though the market elapsed into dullness prior to the closure at Singapore for the Chinese New Year holidays, sellers remained chary in offering.

Latest prices are as follows:

No. 1 RSS Spot: 24½d.-24⅝d.

Settlement House:

March 24½d.-24⅝d.

April/June 24½d.-24⅝d.

July/September 24½d.-24⅝d.

October/December 24½d.-24⅝d.

January/March (62) 24½d.-24⅝d.

No. 1 RSS cif basis ports:

February 23¾d.-24d.

March 23¾d.-24d.

April 23⅞d.-24⅛d.

Godown:

February 79½ cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, February, March, April, 13s. 10d., cif European ports. Spot, seller, 14s. 5d. Bulk, seller, d.w. 13s. 8d. Creamed, seller (not quoted). Normal, seller, February, March, 11s. 8d.

NEW YORK

The New York rubber market ruled as under on February 13:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Feb. 13	Previous
No. 1 RSS, February ..	29½a	29n
March ..	29½a	28⅞n
No. 2 RSS, February ..	29⅜a	28⅞n
March ..	29⅜a	28⅝n
No. 3 RSS, February ..	29¼a	28⅝n
March ..	29a	28⅛n
No. 1 RSS, Spot ..	29½n	29n
No. 3 amber blanket crepe, February ..	24n	23⅞n

FUTURES—REX CONTRACT

	Feb. 13	Prev. Close
March ..	29.15b–29.50a	29.15b–29.35a
May ..	28.75t	28.45b–28.55a
July ..	28.50b–28.60a	28.25b–28.35a
Sept. ..	28.50b–28.60a	28.20b–28.30a
Nov. ..	28.50b–28.60a	28.20b–28.30a
Jan. ..	28.40b–28.60a	28.10b–28.25a

Sales: 61. Tone: Quiet.

Futures were firm on February 13, up about half a cent per lb., some positions on short covering reflecting gains abroad. Early dealings were moderately active. Profit-taking developed later in the nearby March position and most of the early gains were pared. However, other positions still continued firm. Dealings were moderately active. Traders said physical rubber was quiet today. In accordance with a previous announcement, the United States Rubber Company closed its Detroit rubber plant for the week beginning today. The company gave the need to balance inventories as a reason for the shutdown. In the closing stages a paring of the early gain was noted in some positions. Physical rubber registered a moderate gain for the day.

SINGAPORE

Prices moved higher in quiet trading during the morning of February 13 on reserve of sellers. Interest in lower sheets was small but offers were restricted to some prompt parcels. The market was buoyant during the afternoon on general trade buying. Forwards were in demand and sellers were scarce. The market closed very steady in afterhours trading.

	Malayan cents per lb., fob Malayan ports to open ports	
	Feb. 13	Prev. Close
No. 1 RSS, March ..	81¾–81⅞	79½–79⅝
April ..	82¼–82½	—
No. 2 RSS, March ..	81 –81⅛	—
No. 3 RSS, March ..	80⅛–80⅜	—
No. 4 RSS, March ..	76⅛–77¼	—
No. 5 RSS, March ..	67⅛–68¼	—
No. 1 RSS, Spot ..	81⅝–81¾	79¼–79½
No. 3 blanket thick remilled crepe, March	64⅛–65¼	—
No. 1 fine pale crepe, March	86 –88	—
2X thin brown crepe, March	63¼–64¼	—

Tendency: Very steady.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 159.60d. per gallon.

AMSTERDAM

The Amsterdam rubber market ruled as under on February 13:

	Guilders per kilo	
No. 1 RMA	Feb. 13	Previous
February	2.36½	2.33½
March	2.37	2.34
April	2.37½	2.34½
May	2.37	2.34
June	2.37½	2.34½
April/June	2.37	2.34

Sales: Nil. Tendency: Very steady.

DJAKARTA

The market opened steady but quiet on February 13. At noon about 30 tons of sheet No. 1 for ready delivery were traded at 31 rupiahs per kilo. In the afternoon the market turned easy owing to lack of buyers. About 20 tons of sheet No. 2 were transacted near the close at 30 rupiahs per kilo. The market closed easier. Sellers were in the majority and there was a lack of buyers due to the approach of the Chinese New Year celebrations.

	Rupiahs per kilo	
	Feb. 13	Previous
Spot No. 1 priok ..	30.25b	29.50b
Spot No. 2 priok ..	29.25b	28.50b
Spot No. 3 priok ..	27.50b	26.75b
No. 1 fine pale crepe, spot	28.75b	28.50b

CEYLON

No. 1 RSS. The price of No. 1 RSS at Colombo on February 13 was 91 (87) Ceylon cents per lb.

BANGKOK

No. 1 RSS. The price of No. 1 RSS at Bangkok on February 13 was 26.00 (25.75) US cents per lb.

STOCK MARKET

Continued from page 269

6½% stock, 1981-86 at £98½%. All up a sum of £3m. is being gathered together. These issues are being made to re-finance the purchase of a number of businesses during the year.

At the same time, the directors said that they hoped to pay a final dividend of 8¾% on the present capital which, with the 2½% interim which has already been paid, would make a total of 11¼% for 1960, compared with equal to 8% for the previous year, and the forecast of 10% made at the time of the scrip issue last June. They expect to maintain 11¼% for 1961 on the capital as increased by the proposed issue.

Foamair Move

Foamair Ltd. has changed its address to 21 West Ferry Road, Millwall, London, E.14. Telephone East 5665.

Future Events

Institution of the Rubber Industry

London Section.—Feb. 24 at the Café Royal, 68 Regent Street, London, W.1. Dinner and dance.

Patent Specifications

Due to pressure on space this regular feature has had to be held over. It will appear next week.

Crop Returns

Unless otherwise indicated, the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

December

HARRISONS AND CROSFIELD

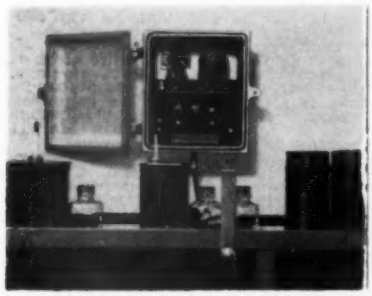
London Asiatic—1,781 (1,767). 12 mths—19,290 (18,398).
Oriental—323 (305). 12 mths—3,473 (3,082).
Bukit Kajang—152. 12 mths—1,447.
Landron—522 (492). 12 mths—5,293 (5,310).
Pataling—1,536 (1,503). 2 mths—2,893 (2,873).
Jugra Land and Carey—486 (566). 2 mths—970 (1,055).
Golden Hope—813 (841). 10 mths—7,227 (7,404).
New Crocodile—281 (251). 10 mths—2,417 (2,350).
Castlefield—275 (281). 6 mths—1,699 (1,653).
Holyrood—107 (96). 12 mths—1,055 (912).
Hongkong—37 (32). 12 mths—391 (321).
Hoscote—291 (253). 6 mths—1,665 (1,436).
Killinghall—58 (48). 6 mths—315 (264).
Kuala Selangor—69 (67). 12 mths—803 (750).
Kulai—202 (178). 2 mths—397 (346).
Malaysia—73 (71). 12 mths—723 (652).
Prang Besar—384 (286). 9 mths—3,109 (2,281).
Sandac—66 (79). 9 mths—615 (714).
Seaport—104 (80). 6 mths—540 (429).
London Sumatra—3,148 (2,753). 9 mths—23,647 (21,228).
Bah Lias—220 (170). 2 mths—441 (328).
Central—88 (82). 6 mths—465 (425).
N. Tongan—292 (254). 4 mths—1,067 (968).
Sialang—271 (240). 11 mths—2,494 (2,203).
Tanah Datar—99 (82). 12 mths—902 (818).
Malayalam—1,196 (915). 9 mths—7,328 (6,080).
Lunuva—135 (144). 12 mths—1,237 (1,316).

Industry INTELLIGENCE

Machines, Materials and Equipment

Pulsimitor Counter

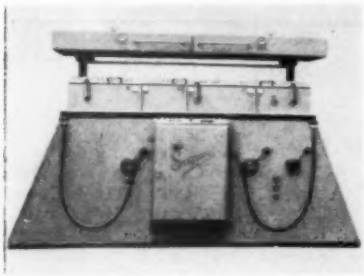
Whilst there are a number of electronic units on the market that can be made to register the presence of a wide variety of articles and to thereby trigger off a sequence of action, there still remains a number of problems with which they cannot be expected to cope. Electronic Machine Co. Ltd., Mayday Road, Thornton Heath, Surrey, have just introduced their Pulsimitor which is a capacity operated switch that will give a pulse output against a very small change in input capacity. Speed of operation is up to 12,000 per minute and down to five per minute.



As the illustration shows it will count or sense random shaped containers and objects made from such widely different materials as plastics, metal, glass and alloys, even though they be touching or spaced, near or far to the probe, or of uneven contour so long as a small change of contour is presented to the probe.

Vacuum Forming Machine

In addition to the VP 257, Technoimpex, Dorottya U6, Budapest V, is now producing a vacuum forming



machine known as the VP Super. This may be hand operated or can be used on a semi- or fully-automatic time cycle and can be used to produce mouldings from 170 x 83cm. to 20 x 20cm. The mould frame can be set within these limits for 50 intermediate sizes in increments of 10 x 10cm. and the maximum depth of draw is 40cm. The heater capacity is 25kW and the vacuum pump, which has a capacity of 16cu.m./hour is connected with a 200 litre vacuum tank enabling a high vacuum to be attained in a few seconds.

Publications

Aerodux Glued Wood Structures

Glued timber structures have an established reputation for strength in relation to weight, durability and manageability on site in building applications and particularly for roof structures.

Technical Notes 217 issued by Ciba (ARL) Ltd., Duxford, Cambridge, describes the development and production of 'Tecton' roofing units manufactured and marketed by Dexion Ltd. These units consist of a web of resin-bonded plywood stiffened at top and bottom with two flanges of softwood bonded to the plywood with Aerodux 185 adhesive.

The leaflet shows how these structures are built up and also includes several illustrations of extensive building operations using them, resulting in roof structures which are simple, rigid and economic.

Surface Coatings

The Steelcote Manufacturing Co., Saint Louis 3, Mo., USA, numbers among its products a wide range of coating materials including epoxys, alkyds, silicone polysulphide polyurethane and chlorinated rubbers, phenolics, acrylics and vinyls.

Catalogue No. 59 called 'Coatings for Industry' describes these products, each being grouped in the classification where its formulation offers special advantages. The main classifications are: heavy-duty interior wall coatings, anti-corrosive coatings, industrial enamels, heavy-duty floor materials, heavy-duty exterior wall and roof coatings and miscellaneous service items. Steelcote products shown in the booklet find application in a number of industries including chemicals, brewing, meat handling and building.

Epoxide Toxicity

Technical memorandum 103 issued by Bakelite Ltd., 12-18 Grosvenor Gardens, London, S.W.1, provides information on the toxicological aspects of the handling of Epoxide 201.

The results of single exposure studies on animals carried out by the industrial medicine and toxicology department of Union Carbide Corporation are given.

These show that the material represents only a slight hazard except for repeated or prolonged contact with the skin and oral intake where it is classed as a moderate hazard. Evidence shows that although Epoxide 201 is not a highly active tumour causing agent, such action does occur and it is therefore desirable to prevent contact with the skin where possible.

The LD_{50} value for the material is quoted as 4.92ml./kg. body weight, this referring to the quantity of chemical that kills 50% of exposed animals on a single oral dose. (For a quantitative comparison the LD_{50} value for isopropyl alcohol is 5.84.)

Technical Data

Epoxide 201

A recent addition to the Bakelite range of resins is Epoxide 201 and information on the properties and formulation of the material is contained in advance information sheet E.33 available from 12-18 Grosvenor Gardens, London, S.W.1.

The advantages claimed for this resin include low viscosity (1810 cps. at 25°C.), colour stability, high temperature stability (heat distortion temperatures up to 450°F. can be obtained by correct choice of hardener system) and high reactivity, making possible fast cures with anhydride and dibasic acid hardeners.

Details are also given in the leaflet on typical formulations using BF_3-Piperidine complexes, polycarboxylic acids, anhydrides, modified anhydride systems, amines and polyhydric phenols.

Polypropylene Pigments

The suitability of a number of colouring matters for polypropylene has been examined by the Dyestuffs Division of I.C.I. Ltd. Technical information sheet No. 590 lists those selected as being of interest and gives details of their fastness properties.

Tests carried out to determine the best pigments included heat stability, migration over a storage period of at least six months, light fastness and weathering fastness using methods prescribed in BS 1006, and dispersability.

Experience has shown that pigments disperse less readily in polypropylene than in polythene and the mouldings were assessed for general evenness of colouring and absence of colour specks and streaks.

For most of the work, the dry tumbling/injection moulding technique was used and no special devices were fitted to the injection moulding machine although there is evidence that advantages can be gained by the use of such aids as the Ferro Venturi.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

SOGRAD (807,273) Chemical preparations sold complete in plastic containers incorporating a dispensing device, for introduction of such chemical preparations into refrigerator cooling waters, boiler feed water and the like to inhibit the formation of algae and scales. Borite Ltd., Stratton Works, 13 Croydon Road, Westerham, Kent. (Class 1; January 25 1961.)

CONVERTO-POL (811,281) Cold-setting synthetic resins in liquid form. Plastic Polishes Ltd., 464 London Road, Croydon, Surrey. (Class 1; January 25 1961.)

BORVIBET (811,477) Chemical products used in industry, and polyvinyl acetate dispersions being chemical products for use as an additive to cement for improving the properties of concrete. Aktieselskapet Borregaard (a joint stock company organised under the laws of Norway), Sarpsborg, Norway. Address for service is c/o Gee and Co., 51/52 Chancery Lane, London, W.C.2. (Class 1; January 25 1961.)

BORVILI (811,479) Chemical products used in industry, and polyvinyl acetate dispersions being chemical products for use as raw material in the manufacture of glue for use on paper and wood. Aktieselskapet Borregaard (a joint stock company organised under the laws of Norway), Sarpsborg, Norway. Address for service is c/o Gee and Co., 51/52 Chancery Lane, London, W.C.2. (Class 1; January 25 1961.)

CONVERTO-POL (811,283) Cleaning and polishing preparations and abrasive preparations. Plastic Polishes Ltd., 464 London Road, Croydon, Surrey. (Class 3; January 25 1961.)

INTERMAC (798,685) Materials included in Class 17 in the form of sheets, tubes and rods, all being goods made of laminations of synthetic plastics and regenerated cellulose. Hamac AG (a joint stock company organised under the laws of Switzerland), Bahnhofstrasse 5, Zug, Switzerland. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 17; January 25 1961.)

CERAPLAST (790,969) Non-metallic compositions (not being paints) in paste form, containing epoxy resins, and being for use in building and civil engineering construction as surface coatings by plastering, trowelling and brushing. England, Hughes, Bell and Co. Ltd., Valley Works, Monton Road, Eccles, Lancashire. (Class 19; January 25 1961.)

CARBOWAX (779,381) Polythene glycols and methoxy polythene glycols. Union Carbide Corporation (a Corporation organised and existing under the laws of the State of New York, United States of America), 270 Park Avenue, New York, 17, State of New York, United States of America. Address for service is c/o Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W.C.2. (Class 1; January 25 1961.)

MAGIXO (806,312) Chemical preparations for use in the dressing, finishing and renovation of leather and of plastics. Meyer Robert Magid, 424 3rd Street, Oakland, 7, State of California, United States of America. Address for service is c/o Haseltine, Lake and Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2. (Class 1; January 25 1961.)

AUSTOPAK (808,219) Containiers made of cardboard or of plastics, and included in Class 16. James Austen Ltd., South Boundary Road, Kirkby Industrial Estate, near Liverpool. (Class 10; January 25 1961.)

CELPAK (806,885) Plastics in the form of powders, pastes, liquids, emulsions, dispersions and granulates, and being for industrial use. The Baxenden Chemical Co. Ltd., Clifton House, 83-117 Euston Road, London, N.W.1. (Class 1; January 25 1961.)

Increases of Capital

Jitra Rubber Plantations Ltd. (279,653), 13 Rood Lane, E.C.3. Increased on May 11 1960, by £125,000 in 2s. shares, beyond the registered capital of £125,000.

Kuala Pergau Rubber Plantations Ltd. (284,827), 110 Cannon Street, E.C.4. — Increased on March 31 1960, by £25,000 in 2s. ordinary shares, beyond the registered capital of £90,000.

Coverplas Ltd. (654,474).—Manufacturers of fabric materials, plastics, etc., 15 Gildredge Road, Eastbourne. — Increased on May 16 1960, by £2,000 in £1 ordinary shares, beyond the registered capital of £500.

G. W. Warwick Ltd. (550,967), formerly Earl Plastics Ltd., 66 Moor Street, Birmingham.—Increased on May 10 1960, by £4,500 in £1 shares, beyond the registered capital of £500.

Changes of Name

First Linator Ltd. (657,737), 1-4 Tower Street, E.C.3. Name changed to London Sumatra Plantations Ltd. on May 16 1960.

Proudinter Ltd. (652,745), 90½ Shaftesbury Road, Brighton.—Name changed to Permaprint Plastics Ltd. on June 20 1960.

Shillinglaw Ltd. (349,495), Frog Island, Manor Way, New Road, Rainham, Essex. —Name changed to Phoenix Plastics Ltd. on June 8 1960.

Plastic Materials Ltd. (395,381), 3 Red Place, Grosvenor Square, W.1. — Name changed to Trading and Management Company Ltd. on June 23 1960.

Latest Wills

Mr Fordyce Charles Jones, of 20 East Lodge, Lancing, Sussex, formerly of Princes Square, Hove, Sussex, former chairman of the Reliance Rubber Co. Ltd., who died on November 14 last, left £5,229 10s. gross, £5,083 19s. 1d. net value.

John Clayton Laing, of Tailand, Dalbury Lees, Derbyshire, once Derby area manager of St. Helens Cable and Rubber Co. Ltd., who died on October 29 1959 left £11,042 10s. 10d. gross, £10,407 19s. 8d. net value.

One of the latest rubber swim-caps in the Kleinert range avoids the 'damped down' look. On the left the blonde wears her own hair—on the right Pompadour, which is said to dry quickly and stay curly

NEW COMPANIES

Barbid Plastics Ltd. (680,141). January 10. Capital: £100 in £1 shares. The subscribers are: Laurence R. Battell, 117 Hart Road, Thundersley, Essex (law agent); William J. Wildman, 64 Woodside Avenue, N.12 (law costs draughtsman). The first directors are to be appointed by the subscribers.

Barram Plastics Ltd. (680,142).—January 10. Capital: £100 in £1 shares. Other particulars are similar to Barbid Plastics Ltd. (q.v.).

Dumor Plastics Ltd. (680,614).—January 16. Capital: £100 in £1 shares. To carry on the business of manufacturers in connexion with resins, polymers, plastics or other chemicals, etc. The directors are: Gerald C. Megson, 188 Windsor Road, Oldham; Edward Mercer, The Moorlands, The Park, Grasscroft, near Oldham (directors of Simon Megson Ltd., etc.).

B.C. & W. (Plastics) Ltd. (680,750).—January 16. Capital: £100 in £1 shares. The directors are: George A. Spencer, Strathmere, 29 Broadway, Bramhall, Ches.; Joseph A. Evans, Beechcroft, Underwood Drive, Rawdon, Leeds; George S. Marr and James A. Young (all directors of The British Cotton and Wool Dyers Association Ltd., etc.). Regd. office: Cumberland House, Lissadel Street, Pendleton, Salford, 6.

Rudecsdass Plastics Ltd. (680,808). — January 17. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic materials, etc. The subscribers (each with one share) are: Jean Herbert and Thomas A. Herbert, both of 156 Strand, W.C.2. The first directors are to be appointed by the subscribers.

Kay Tyres Ltd. (680,643).—January 16. Capital: £10,000 in £1 shares. To carry on the business of manufacturers, repairers, importers and exporters of, and dealers in, tyres of all kinds, etc. The permanent directors are: Frank Kay, 398 Duffield Road, Allestree, Derby; John Kay, 5 Thornhill Road, Rowditch, Derby.

Coe & Lyonson Ltd. (680,703).—January 16. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in fancy goods, plastic, rubber, leather and other goods, etc. The directors are: Enta Coe, 74 Ravenscroft Avenue, Wembley, Middlesex; Malka Lyonson, 58 Teignmouth Road, N.W.2 (handbag manufacturers). Regd. office: 52/3 Margaret Street, W.1.

Parmick Engineering Ltd. (680,666).—January 16. Capital: £3,000 in 2s. shares (20,000 ordinary and 10,000 employees). To acquire the business of the production of automatic components, press work, steel stockists, the production of hardware and plastic articles, and factoring the same, metallurgical and ancillary treatments carried on by N. H. and M. C. Parr at Castle Street, Hill Top, West Bromwich, etc. The directors are: Kathleen M. Parr, 8 Wrekin Lane, Tettenhall; Michael C. Parr, 44 Redhouse Road, Tettenhall; Winifred Shaw. Regd. office: Woden Factory Centre, Holyhead Road, Wednesbury.

Bruxbat Plastics Ltd. (681,106).—January 19. Capital: £100 in £1 shares. To carry on the business of manufacturers of, and dealers in, plastic materials, etc. The subscribers (each with one share) are: Jean Herbert, company director, and Thomas A. Herbert, barrister, both of 156 Strand, W.C.2. The first directors are to be appointed by the subscribers.

Solution to RJIP Crossword

(See page 265 this issue)

ACROSS.—1, Calcium. 7, Oliver. 8, Maria. 9, Exempt. 11, Ladders. 13, Trader. 14, Amulet. 16, Rootlet. 19, Kettle. 21, Elate. 22, Parrot. 23, Yearned.

DOWN.—1, Camelback. 2, Lurid. 3, Irate. 4, Molest. 5, Life raft. 6, Keep. 10, Tyre tread. 12, Dilatory. 15, Treaty. 17, Opera. 18, Learn. 20, Elan.

R·J·I·P· CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 12/6 Box 2/-

CHEMIST wanted for technical sales position dealing with resins for surface coatings, printing inks, floorings, rubber and adhesives. Candidates should be in the age group 30-35 with a background experience of research and development on synthetic resins of alkyd and rosin modified types together with technical service contacts on their applications.—Apply giving full details of qualifications, experience and salary to Technical Director, Watts Ltd., 72-75 Fenchurch Street, London, E.C.3. (838)

CHEMIST required for an expanding company in Manchester area. Candidates should be at least 25 years of age, and possess a minimum of Inter.B.Sc., or an equivalent qualification, with sound industrial background. Experience in polyurethanes desirable but not essential. Own staff informed.—Apply stating full particulars, including present position and salary to Box 839. (839)

JUNIOR laboratory assistant, age 16-18 years, required for a rapidly expanding company in N.W.10 area. Preferably educated to G.C.E. standard. Time allowed for study in rubber technology. Five-day week.—Write Box 831. (831)

LABORATORY assistant aged 20/23 years required. Experience in latex and/or dry rubber manufacture preferred.—Reply in writing, stating age, qualifications and experience to: The Technical Manager, Guide Bridge Rubber Co. Ltd., Butcher Lane, Bury. (834)

P.T.F.E. Mechanicals Production. Midlands manufacturer has unusually attractive opportunity for a man with experience and initiative to take complete charge of newly formed and expanding division in an enterprising company. An excellent salary will be paid to the right man. Our staff are informed of the vacancy and all replies will be treated in absolute confidence.—Box 843. (843)

RUBBER chemist/technologist required by a progressive medium sized rubber company to fill the position of chief chemist. Applications are invited from chemists with experience in compounding, process control and development. A contributory pension scheme operates. Housing assistance will be given. All applications will be treated in confidence.—Write stating age, present salary and full details to Box 803. (803)

SEALS. If you have had experience in production or development in any aspect of seal manufacture and want opportunity to work on your own initiative and expand with a progressive company, we will be able to use you. We have an excellent pension scheme and good salaries will be paid.—Write in confidence to Chief Chemist, B.A.L. Limited, Oakeywell Street, Dudley, Worcs. (844)

TECHNICAL superintendent required for substantial rubber company in the Midlands. Good salary paid to man of first-class experience in all aspects of manufacture of mechanicals and extrusions. Please send full details of positions held and salaries paid. Only men of proved experience and capability should apply.—Box 836. (836)

TECHNICAL salesman required for progressive medium sized rubber works manufacturing mechanical goods. Successful candidate may have to travel abroad and knowledge of French and/or German desirable but not essential. Contributory pension scheme in operation. Housing assistance can be given. Write stating age, present salary and full details of experience and technical qualifications.—Box 801. (801)

ASSISTANT
WANTED FOR
RUBBER WORKS MANAGER

Age 22 to 28. L.I.R.I. standard. Mechanical ability a distinct advantage. Salary to suit an energetic young man. Post is in Hackney area and candidate must reside within reasonable travelling distance.—Details of age, experience, present salary, etc., in envelope marked 'Private' to General Manager, I. B. Kleinert Rubber Company, 91 New Bond Street, W.1. (813)

APPOINTMENTS VACANT

(continued)

RUBBER technologists (age 23-27), with L.I.R.I. qualification and some practical experience are required to form a small team responsible for the technical control of all manufacturing processes and for the solution of technical problems arising in production departments. Experience of compounding operations is essential and applicants should preferably have some knowledge of the manufacture of one of the following products: hose (braided and ply), belting (including PVC) and general mechanicals. Generous starting salaries are offered to attract young qualified men who are seeking promotion to responsible positions in production or technical departments. Terms of employment include annual salary reviews, year-end bonus, superannuation, removal and housing assistance.—Applications should be addressed to Personnel Officer, George Angus and Co. Ltd., Walker Works, Newcastle upon Tyne, 6. (811)

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The Board of the Rubber Research Institute invites applications from Rubber Technologists for the post of Research Officer, Division A, in the Chemical Division of the Institute at Kuala Lumpur, Federation of Malaya.

The successful candidate must possess the A.N.C.R.T., A.I.R.I. or equivalent qualifications. A degree in Physics or Chemistry would be an advantage. He must also have practical experience in the rubber manufacturing industry and be well acquainted with the use and maintenance of rubber testing equipment.

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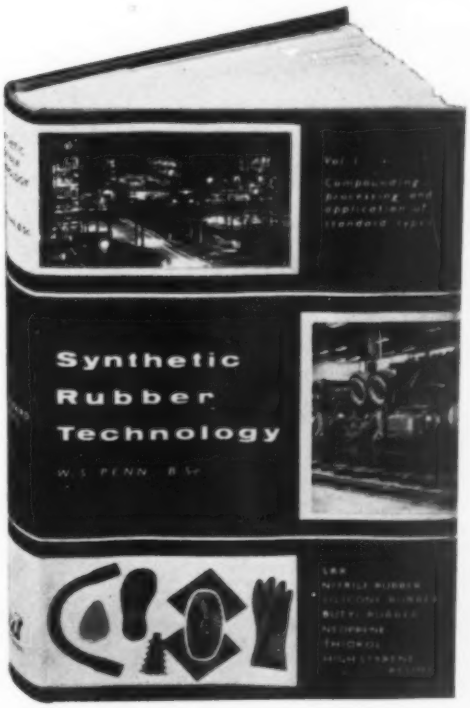

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